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Southern Medical Association, Forty-Sixth Annual Meeting, Miami, Florida, November 10-13, 1952

TABLE OF CONTENTS

Problems Associated with Employment of Handicapped People in Industry. C. U. Dernehl, Texas City, Texas 779

Discussed by R. Lomax Wells, Washington, District of Columbia.

Hand Disabilities. F. L. Flack, Tulsa, Oklahoma 784

Discussed by M. A. Connell, Picher, Oklahoma; J. S. Chalmers, Sand Springs, Oklahoma.

Localization of Intracranial Neoplasms with Radioactive Diiodofluorescein. Robert Dean Woolsey, George E. Thoma and Robert E. Mack, St. Louis, Missouri 789

Discussed by D. L. Tabern, North Chicago, Illinois; William S. Fields, Houston, Texas; Thomas W. Farmer, Dallas, Texas.

Results of Lobotomy in Mental Disorders. James G. Lyerly, Jacksonville, Florida 793

Otitis Media with Effusion. J. Dudley Singleton, Dallas, Texas 798

Viral Hepatitis Following the Use of Ultraviolet Irradiated Human Plasma. J. L. Thompson, Jr., Sylacauga, Alabama, and W. D. Sutliff, Memphis, Tennessee 801

Problems in Anesthesia for Intestinal Obstruction. Robert B. Dodd, Dallas, Texas 805

Management of Injuries of the Urethra and Genitalia. Jack Hyman, Mobile, Alabama 810

Discussed by Evan L. Lewis, Washington, District of Columbia; John F. Patton, St. Louis, Missouri.

Intramedullary Fixation of Fractures of the Forearm. R. H. Hall, Fayetteville, North Carolina, E. I. Bugg, Durham, North Carolina, and R. E. Vitolo, Fayetteville, North Carolina 814

Discussed by Robert A. Knight, Memphis, Tennessee; F. Walter Carruthers, Little Rock, Arkansas; Dana M. Street, Memphis, Tennessee.

Surgical Unification of Double Uterus: Technic, Indications and Results. Erwin O. Strassmann, Houston, Texas ... 818

Discussed by Frank R. Lock, Winston-Salem, North Carolina.

Herpes Gestationis and the Rh Factor. Edward P. Cawley, Clayton E. Wheeler and Philip A. Wilhite, Charlottesville, Virginia 827

Discussed by Clinton W. Lane, St. Louis, Missouri; Francis A. Ellis, Baltimore, Maryland.

The Management of Pterygia with Particular Reference to Recurrent Pterygia. George M. Haik, Richey L. Waugh, Jr., Wood Lyda and George S. Ellis, New Orleans, Louisiana 832

Discussed by R. L. Waugh, Jr., New Orleans, Louisiana.

An Electrolysis Apparatus with Added Refinements. Harwell Davis, Jr., and Ray O. Noojin, Birmingham, Alabama 839

The Health Aspects of Civil Defense. John P. Smouse, Oklahoma City, Oklahoma 841

Continued on next page

TABLE OF CONTENTS
Continued

The Responsibilities and Facilities Available in a Private Neuropsychiatric Hospital to the Medical Profession. Arthur J. Schwenkenberg, Joseph L. Knapp and John C. Powell, Jr., Dallas, Texas 844

Discussed by Howard R. Masters, Richmond, Virginia; Leslie B. Hohman, Durham, North Carolina.

The Hospital's Training Program in Relation to the Medical School. B. I. Burns, Kansas City, Missouri 849

Discussed by John C. Mackenzie, New Orleans, Louisiana.

Hay Fever: Some Remarks Concerning Diagnosis and Treatment. William D. Gill, San Antonio, Texas 854

The Life Cycle of the Allergic Individual. Carroll M. Pounders, Oklahoma City, Oklahoma 857

Discussed by Walter L. Rucks, Memphis, Tennessee.

Acute Agranulocytosis During the Use of Tibione: Report of a Case. James A. Davis, Arthur J. Viehman and Walter B. Frommeyer, Jr., Birmingham, Alabama 861

Tung Nut Poisoning. Edward Balthrop, Mobile, Alabama 864

A Critical Analysis of the Young and Elderly Primiparas. John M. Nokes, W. N. Thornton, Jr., Charlottesville, Virginia, and Tom C. King, Jr., Anniston, Alabama 866

Discussed by Roy Lee Grogan, Fort Worth, Texas.

The Treatment of Nonspecific Urinary Infections. W. Leslie Bush, Dallas, Texas 870

Discussed by Dolphus E. Compere, Fort Worth, Texas; Kenneth M. Lynch, Jr., Charleston, South Carolina.

Refracture of the Shaft of the Femur. Jesse N. Borden, Baltimore, Maryland, and William S. Smith, Columbus, Ohio 874

EDITORIALS 877

- Cause of Cancer
- Poliomyelitis Susceptibility
- A Blood Change in Epilepsy
- Twenty-Five Years Ago

BOOK REVIEWS 880

BOOKS RECEIVED 882

A MESSAGE FROM THE PRESIDENT OF THE DADE COUNTY MEDICAL ASSOCIATION, Ralph S. Sappenfield 883

SOUTHERN MEDICAL NEWS 884

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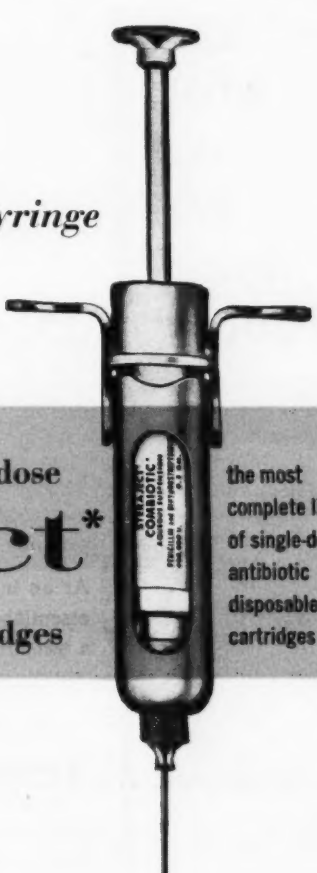

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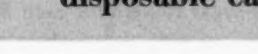

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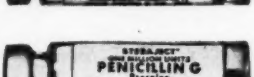

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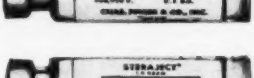

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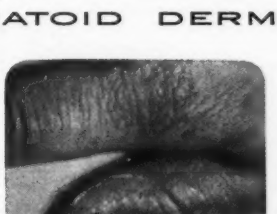

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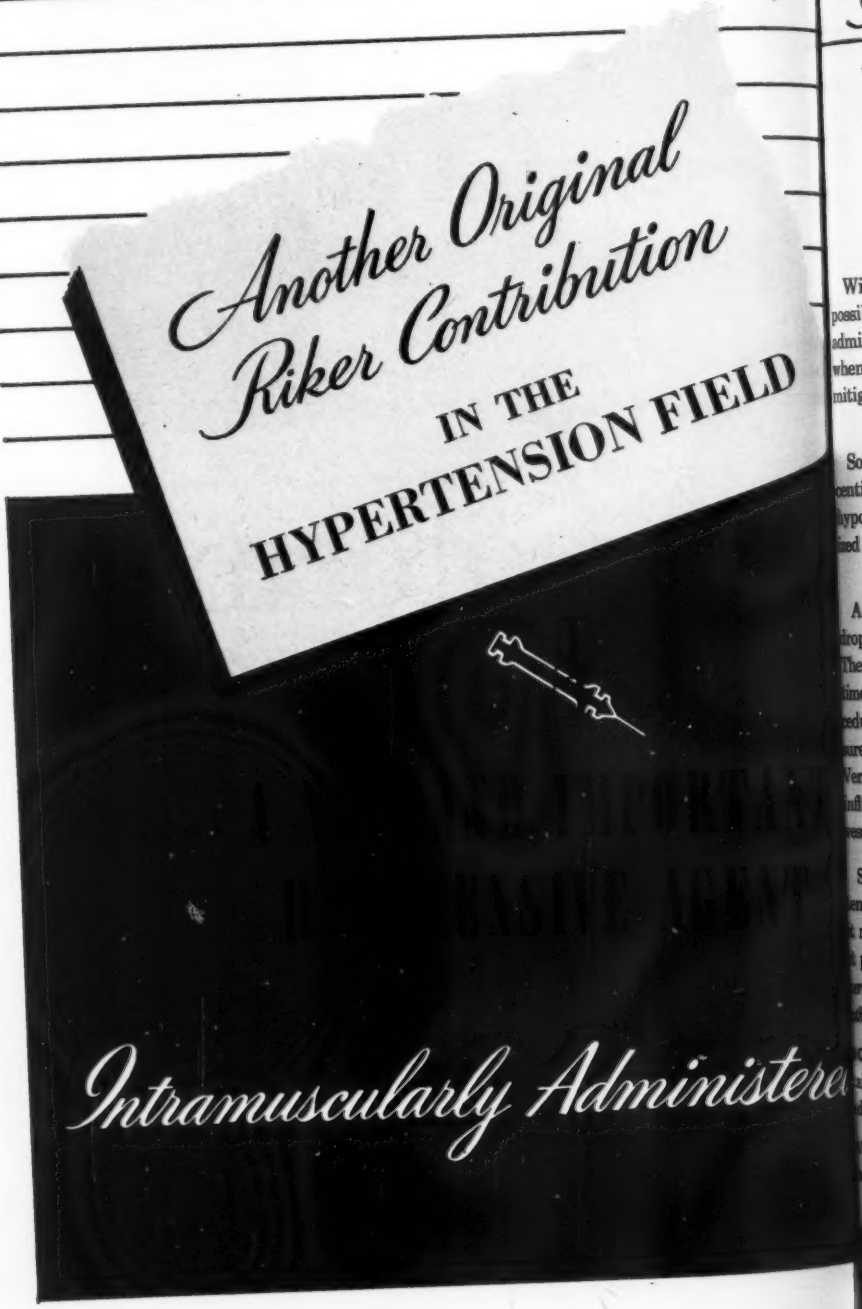
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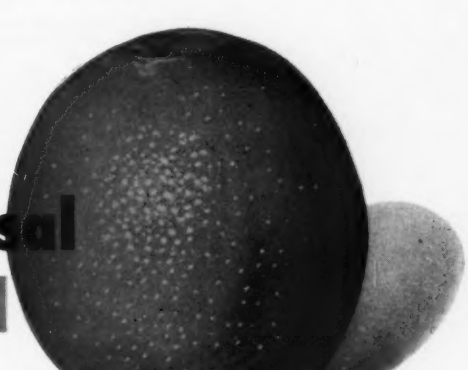

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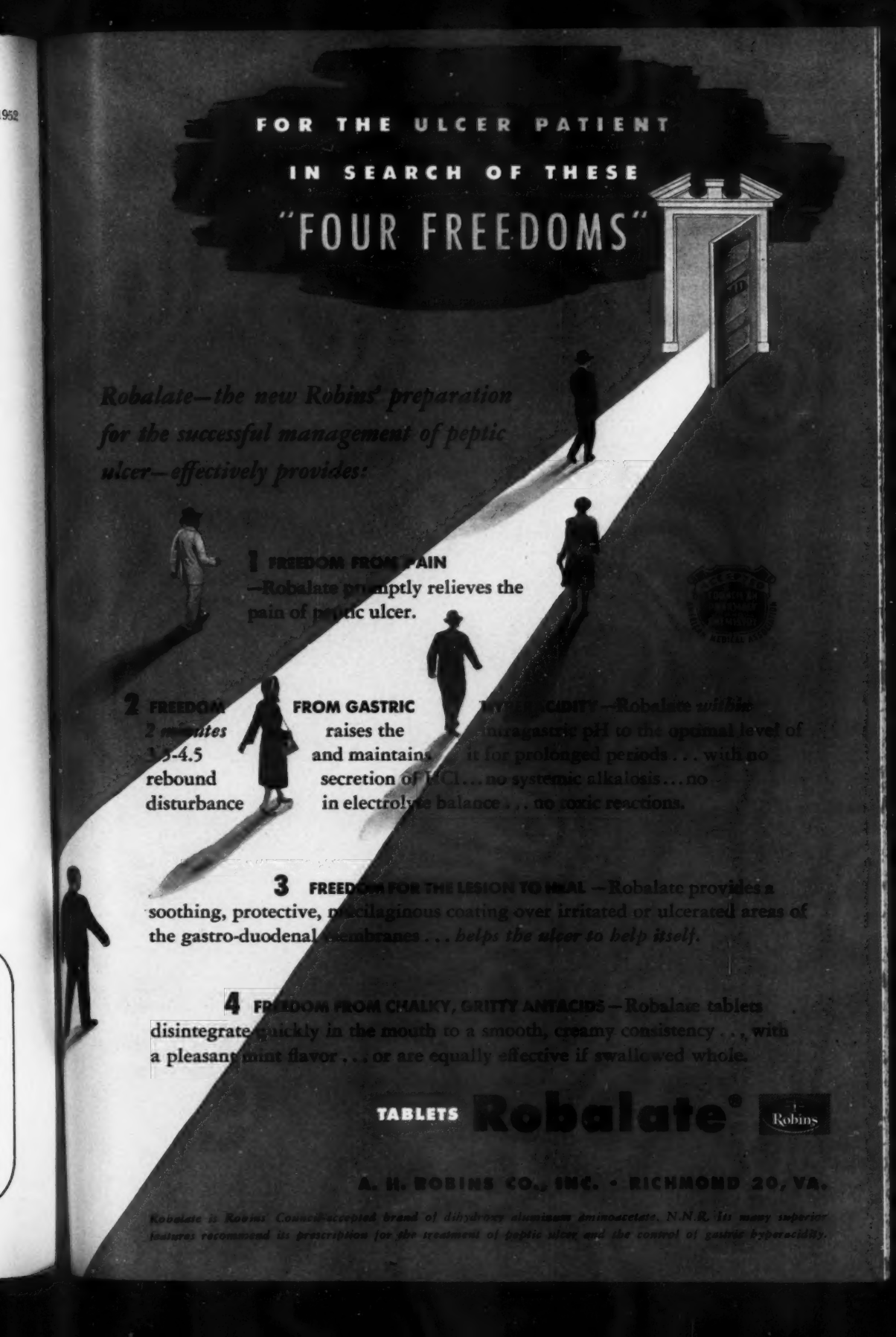
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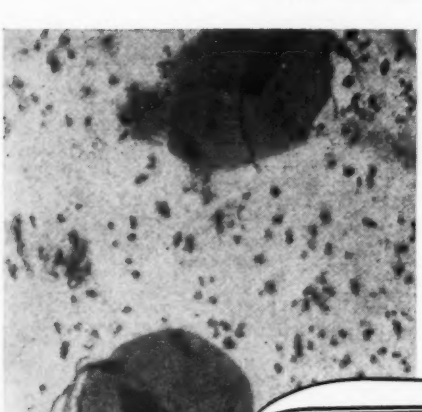

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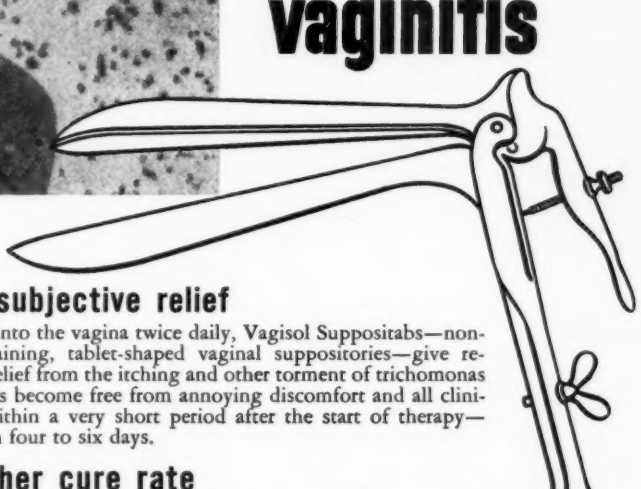

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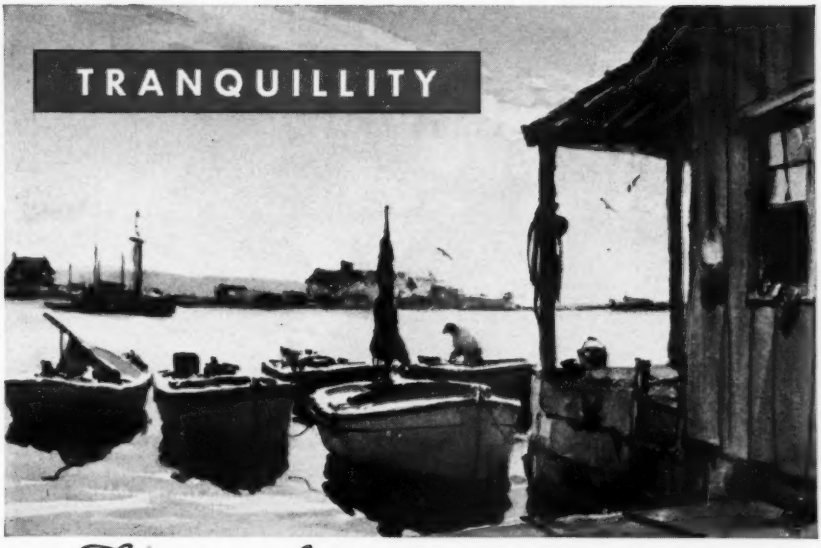


Tranquilize **THE HYPERTENSIVE**

WITH CONSERVATIVE, GENTLE MEDICATION

As a supplement to simple instructions on sensible living, the combined effects of sedation and vasodilation help to reduce nervous and vascular tension.

Theominal exerts a general tranquilizing effect and thus helps to control emotional outbursts that may induce dangerous vascular crises. With continued administration of Theominal a gradual reduction of blood pressure frequently occurs with relief of congestive headache, chest pains, vertigo and dyspnea.

Theominal tablets contain 5 grains theobromine and ½ grain Luminal.® Theominal® tablets contain 5 grains theobromine and ¼ grain Luminal. Both in bottles of 100 and 500.

DOSE: 1 tablet two or three times daily. With improvement the dose may be reduced or omitted periodically.

Winthrop-Stearns, Inc. • ***New York 18, N. Y.*** • ***Windsor, Ont.***

THEOMINAL®

VASODILATOR SEDATIVE FOR ARTERIAL HYPERTENSION

Theominal and Luminal (brand of phenobarbital), trademarks reg. U. S. & Canada.

to supplement treatment with encouragement...

℞ **HASAMAL®**

a carefully formulated analgesic . . . sedative . . . antispasmodic—for effective relief of the pain and anxiety which frequently interfere with smooth recovery

Each **HASAMAL** *tablet contains:*

Phenobarbital	16.2 mg. (¼ gr.)
(WARNING: May be habit-forming)	
Acetylsalicylic Acid (Aspirin)	162.5 mg. (2½ gr.)
Acetophenetidin	162.5 mg. (2½ gr.)
Atropine Sulfate	0.00065 mg.
Hyoscine Hydrobromide	0.0011 mg.
Hyoscyamine Hydrobromide	0.0325 mg.

when *severe pain* demands more potent measures...

℞ **HASACODE®**

providing the actions of HASAMAL *plus codeine.* Available in two codeine strengths — ¼ gr. (HASACODE) and ½ gr. (HASACODE "STRONG").

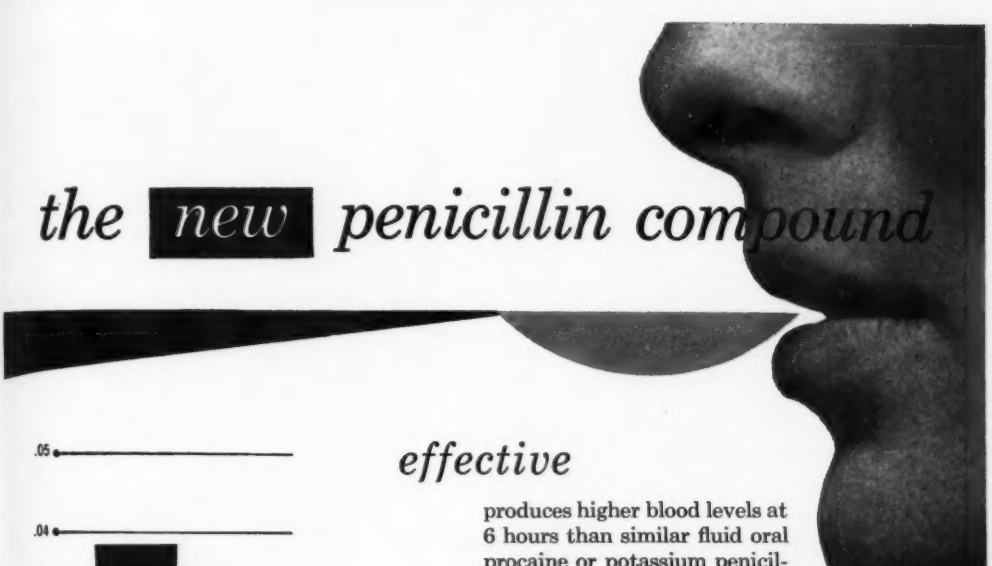
SUPPLIED: HASAMAL — bottles of 100, 500, and 1000 tablets; HASACODE and HASACODE "STRONG" — bottles of 100 and 500 tablets.

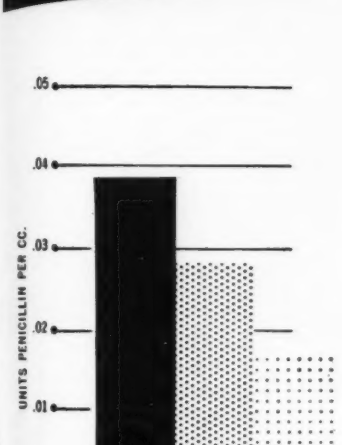
CCH

CHARLES C. HASKELL & CO., INC.

RICHMOND • VIRGINIA

the new penicillin compound





Average penicillin blood concentrations following oral liquid doses of Bicillin, potassium G and procaine penicillin. Single dose of 300,000 units. 30 adult subjects in 3 groups of 10. Each group received a different penicillin on each of 3 succeeding days.

effective

produces higher blood levels at 6 hours than similar fluid oral procaine or potassium penicillin preparations in equivalent doses.

palatable

no penicillin taste or aftertaste. Children and adults willingly adhere to dosage schedule.

stable

for at least 18 months at ordinary room temperature (77°F.)

ready to use

no tedious preparation.

1 teaspoonful (5 cc.), supplies 300,000 units (approximately 300 mg.). May easily be diluted for fractional dosage.

SUPPLIED: Bottles of 2 fl. oz.

oral suspension

BICILLIN*

Benzethacil

N,N'-dibenzylethylenediamine dipenicillin G

Wyeth®

*Trademark

In all cases of functional constipation, prompt and adequate bowel function followed by resumption of normal physiological bowel activity can be achieved with gentle-acting AGORAL* 'WARNER'.

Agoral* 'WARNER'

for constipation

AGORAL* provides three essentials for correction of acute or chronic constipation—*lubrication, gentle peristaltic stimulation,* and *unabsorbable bulk.*

With AGORAL*, there is no forcing, griping pains or anal seepage.

Effective, pleasant in taste, and readily miscible with foods and beverages, AGORAL* is the ideal laxative for young and old alike.

AGORAL* 'WARNER' is available in bottles of 6, 10, and 16 fluidounces.

effective
gentle
corrective

WILLIAM R. WARNER
Division of Warner-Hudnut, Inc.
NEW YORK LOS ANGELES ST. LOUIS

*T. M. Reg. U. S. Pat. Off.

modern man is the victim of this era

War . . . rumors of war . . . atomic devastation . . . too much government . . . economic uncertainty—all a part of a complex pattern, all a part of these troubled times. Today, countless factors are taking their psychic toll in your patients. Mental depression is one of the most common results.

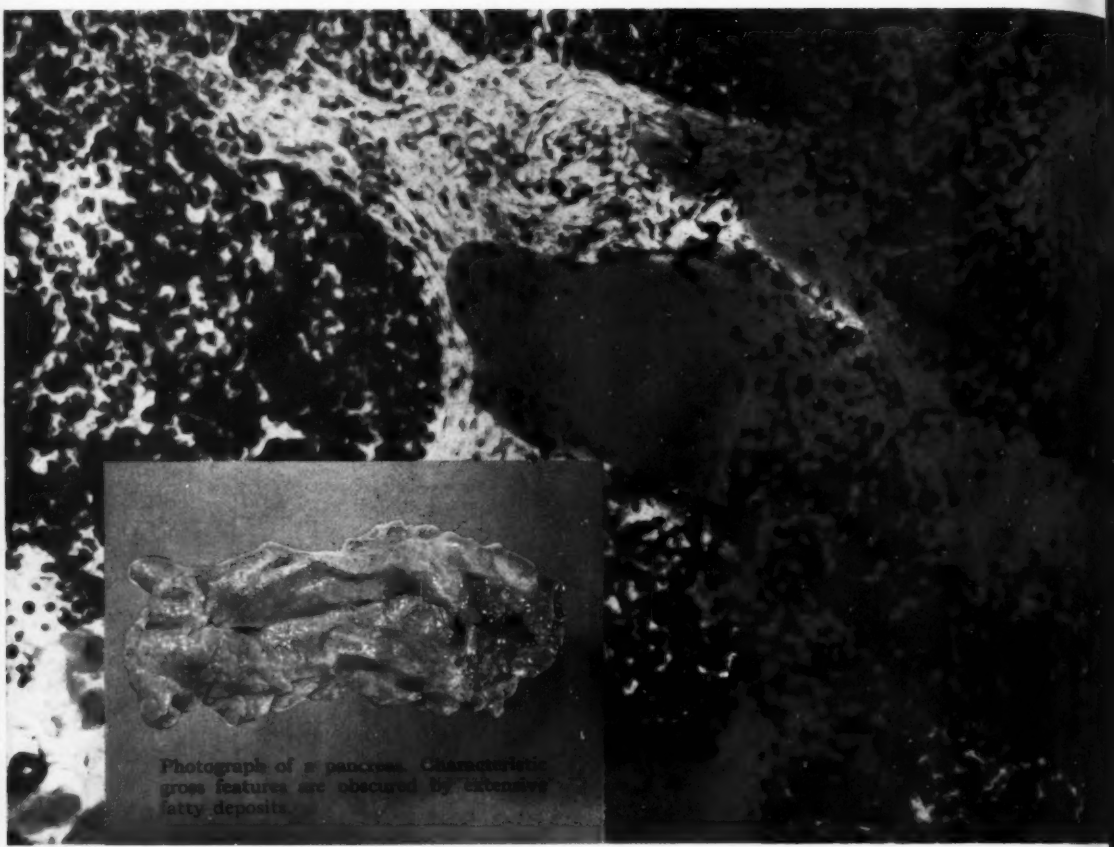
'Dexedrine' Sulfate can do much to help the depressed patient. By restoring mental alertness and optimism, by inducing a feeling of energy and well-being, 'Dexedrine' lifts your patient out of the gloom of depression and helps him to face the future.

Smith, Kline & French Laboratories, Philadelphia

Dexedrine* tablets & elixir

the antidepressant of choice

*T. M. Reg. U. S. Pat. Off. for dextro-amphetamine sulfate, S. K. F.



Microscopic section of pancreas stained for fat with Sudan 4 and counterstained with hematoxylin. This section shows fatty infiltration—orange-red patches—within the stroma of the pancreas. Magnification: × 135. Inset shows pancreas from which section was taken.

The pancreas of an overweight patient

Weight reduction—of even a few pounds—is often the surest means of lengthening life and diminishing future illnesses.

'Dexedrine' Sulfate curbs appetite, makes it easy for the patient to adhere to a low-calorie diet and thus to reduce weight safely—without the use (and risk) of such drugs as thyroid.

Smith, Kline & French Laboratories, Philadelphia

Dexedrine* tablets & elixir

the most effective preparation for control of appetite in weight reduction

*T.M. Reg. U.S. Pat. Off. for dextro-amphetamine sulfate, S.K.F.

PROLUTON · PRANONE

THREATENED AND HABITUAL ABORTION
FUNCTIONAL DYSMENORRHEA
FUNCTIONAL UTERINE BLEEDING

By supplying the progesterone-deficient patient with corpus luteum hormone as PROLUTON administered by injection or as buccal tablets or as PRANONE administered in tablet form, the deficiency is overcome.

Abortion may be prevented, pain eliminated in dysmenorrhea, and hemorrhage controlled in functional uterine bleeding by adequate, properly timed treatment.

PROLUTON® · PROLUTON · PRANONE®

(Progesterone U.S.P. in oil for intramuscular injection)	Buccal Tablets (Progesterone U.S.P. in POLYHYDROL® base)	Tablets (Ethisterone U.S.P., Anhydrohydroxyprogesterone)

Schering CORPORATION · BLOOMFIELD, N. J.

'Carbo-Resin' Therapy

Simplifies Control of Edema

- Permits more liberal salt intake, enhances palatability of diet
- Safely removes sodium from intestinal tract and prevents its reabsorption
- Decreases the frequency of need for mercurial diuretics by potentiating their effectiveness
- May be lifesaving therapy for patients who have developed a resistance to mercury
- Useful in congestive heart failure, cirrhosis of the liver, edema of pregnancy, hypertension, or whenever salt restriction is advisable

Eli Lilly and Company • Indianapolis 6, Indiana, U. S. A.

Lilly

New recipe book helps keep patients on 'Carbo-Resin'

A new *unflavored* 'Carbo-Resin,' which can be incorporated in cookies, puddings, fruit juices, and the like, is now available. Printed recipes giving complete directions for preparing a variety of tasty dosage forms in the home can be obtained from the Lilly medical service representative or direct from Indianapolis upon request.

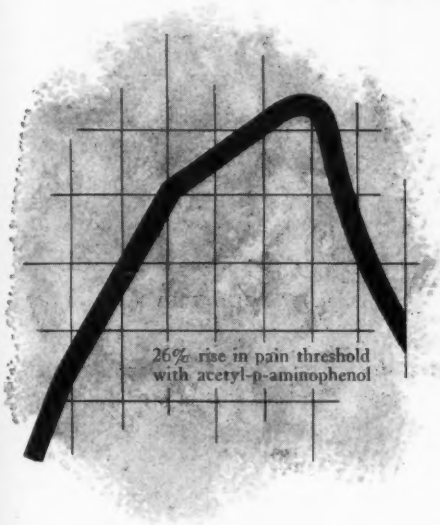
CAUTION: Only unflavored 'Carbo-Resin' is suitable for incorporation in recipes.

PRESCRIBE FLAVORED OR UNFLAVORED

'Carbo-Resin'

(SODIUM REMOVING RESINS, LILLY)

new, fast-acting analgesic containing acetyl-p-aminophenol



Because of its content of acetyl-p-aminophenol, Trigesic quickly raises the pain threshold and provides rapid, sustained relief of pain. A definite rise in pain threshold occurs within 30 minutes and analgesia is maintained for about 4 hours. Trigesic is for relief of pain in common colds, grippe, dysmenorrhea, premenstrual tension, sciatica, simple headache, after dental extractions and minor surgery, rheumatism, migraine, sinusitis, bursitis, myositis and pains of neuropathic origin.

Trigesic, ***per tablet:***

0.125 Gm. (2 gr.) acetyl-p-aminophenol, 0.23 Gm. (3½ gr.) aspirin, 0.03 Gm. (½ gr.) caffeine. Bottles of 100 and 1,000 white, scored tablets on prescription only.

Trigesic with Codeine, ***per tablet:***

16 mg. (¼ gr.) or 32 mg. (½ gr.) codeine phosphate in addition to the other ingredients. Bottles of 100 and 1,000 pink, scored tablets on prescription only.

TRIGESIC

Squibb Analgesic Compound

SQUIBB

"TRIGESIC" IS A TRADEMARK OF E. R. SQUIBB & SONS

Corticotropin (ACTH)

Upjohn

The Upjohn Company in early June announced production of Cortisone Acetate, 25 mg., Tablets.

Now we are announcing the availability of Corticotropin (ACTH).

Sterile Corticotropin (Upjohn) is available in two potencies: in vials containing 25 U.S.P. units and in vials containing 40 U.S.P. units.

Upjohn's extensive experience in the research and manufacture of adrenal cortical products has made it possible to provide the medical profession with *both* Cortisone and Corticotropin.

A contribution of **Upjohn** **Research** *to this era of metabolic medicine*

THE UPJOHN COMPANY, KALAMAZOO, MICHIGAN

New **Steroid-Vitamin-Mineral**

Tablet

COVISTEN

Your patients — young or aged — who need steroidal-nutritional support will have it in a single tablet when you prescribe Covisten. For the young, Covisten will prove invaluable as an anabolic tool — for the aged, an excellent way to supplement waning gonadal function and diminishing intake or utilization of foodstuffs. Covisten supplies Stenediol® (methyl androstenediol — the non-virilizing androgen which imparts the 'lift' unique with steroids) plus vitamins plus minerals in balanced combination.

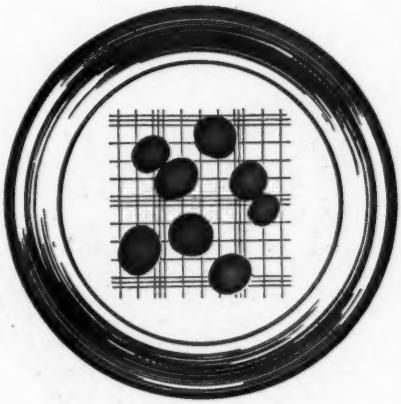
Each tablet supplies:

Stenediol (methyl) androstenediol)	5 mg.
Ascorbic acid	50 mg.
Thiamine HCl	2 mg.
Riboflavin	3 mg.
Pyridoxine HCl	1 mg.
Vitamin B_{12}	2.5 mcg.
Niacinamide	20 mg.
Folic Acid	0.5 mg.
Vitamin A	5000 U.S.P. Units
Vitamin D_3	500 U.S.P. Units
Ferrous Gluconate	75 mg.
Dibasic Calcium Phosphate	200 mg.
Manganese Hypophosphite	0.5 mg.
Dibasic Magnesium Phosphate	20 mg.

Bottles of 100 & 1000

Organon INC. • ORANGE, N. J.

T.M.—Covisten



more than specific therapy...

may be needed to accelerate recovery in the common anemias.

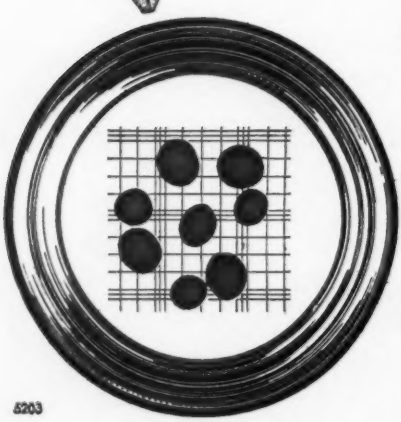
In treating microcytic hypochromic anemia, particularly in the patient of reproductive age or when blood loss of any type is a conditioning factor, you will want to prescribe **not only iron but also all the elements known to be essential for the development and maturation of red blood cells.** "Bemotinic" provides all these factors.

Each capsule contains:		
Ferrous sulfate exsic. (3 gr.)	200.0	mg.
Vitamin B_{12} U.S.P. (crystalline)	10.0	mcg.
Gastric mucosa (dried)	100.0	mg.
Desiccated liver substance, N.F.	100.0	mg.
Folic acid	0.67	mg.
Thiamine HCl (B_1)	10.0	mg.
Vitamin C (ascorbic acid)	50.0	mg.

In macrocytic hyperchromic anemias, the elements contained in "Bemotinic" will provide additional support to specific therapy, or may be used for maintenance once remission has been achieved. In many pernicious anemia patients there is need for iron because of a co-existent iron deficiency.

Suggested Dosage: One or two capsules (preferably taken after meals) three times daily, or as indicated.

No. 340—Supplied in bottles of 100 and 1,000



"Bemotinic"

CAPSULES

for just the right shade of red

Ayerst, McKenna & Harrison Limited
New York, N.Y. • Montreal, Canada

5203

B-P RIB-BACK
is more than a name

It is the hallmark of a fine surgical blade by any standard, reflecting infinite capacity for attention to every detail of quality production.

This means . . . uniform sharpness resulting in maximum cutting performance for the surgeon . . . reduction of time-consuming delays for the entire surgical team . . . an investment in economy for the budget-wise P.A.

B-P blades are now wrapped without oil in a chemical, rust-inhibiting package. No wiping is necessary before sterilization. Unused blades in an opened package may be rewrapped—still protected against corrosion.

Ask your dealer

BARD-PARKER COMPANY, INC.
Danbury, Connecticut

this preparation is indicated in:

Pneumonia
Purulent rhinitis
Nasal pharyngitis
Streptococcal sore throat
Bacillary dysentery
Acute sinusitis
Bronchitis
Tonsillitis
Otitis media
Urinary tract infections

'ESKACILLIN 100-SULFAS

(*formerly 'Eskacillin-Sulfas'*)

the original and outstanding FLUID penicillin-sulfonamide combination

this preparation has important advantages:

1. Increased antibacterial spectrum.
2. Potentiation of antibacterial intensity in certain infections (see graphs).
3. High maintenance of penicillin blood concentrations.
4. Greatly increased safety of triple sulfonamide therapy.
5. Lessened chance of resistant strains.

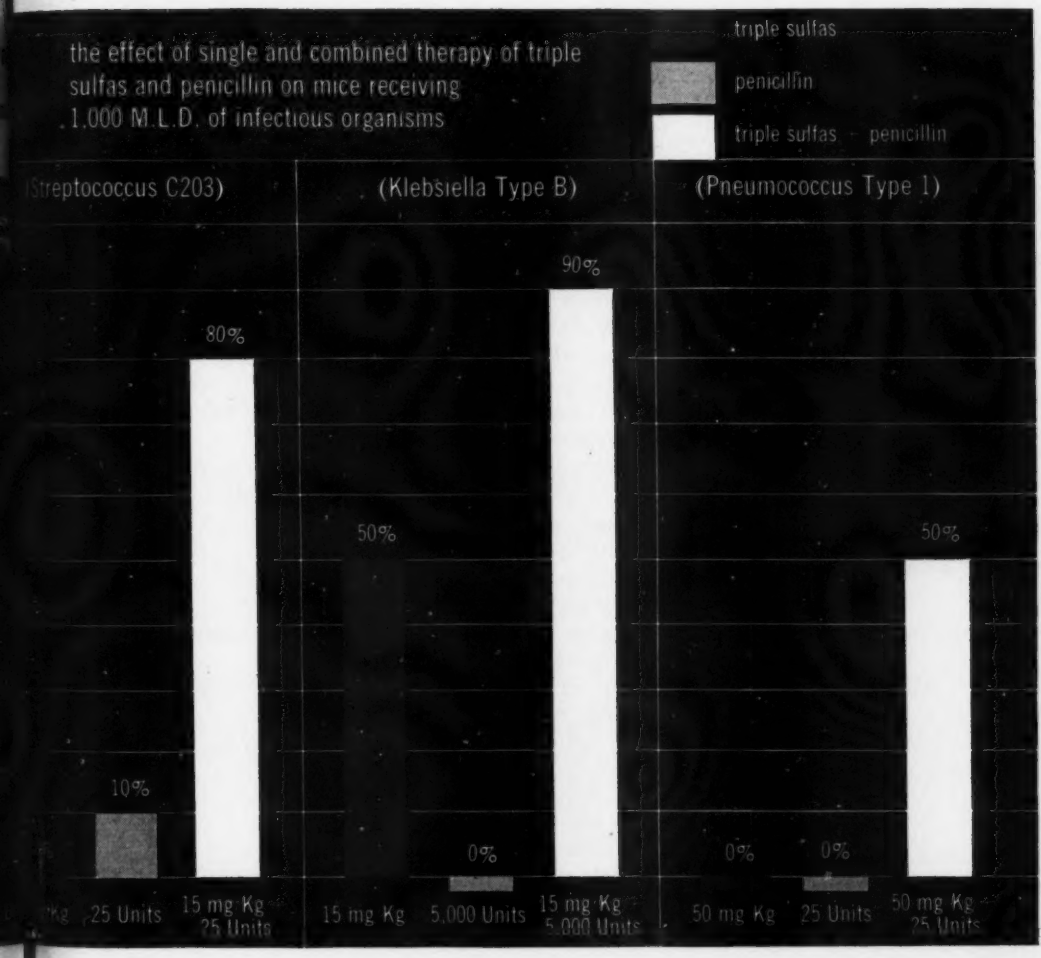
'Eskacillin 100-Sulfas' is so pleasant-tasting that children enjoy taking whatever amount you prescribe. You will find this fluid penicillin-sulfonamide combination a logical preparation to use in treating many of the common bacterial infections of childhood.

ormula: Each teaspoonful (5 cc.) supplies: crystalline potassium penicillin G, 100,000 Units; sulfadiazine, 0.167 Gm.; sulfamerazine, 0.167 Gm.; sulfamethazine, 0.167 Gm.

ailable: On prescription only, in 2 fl. oz. bottles.

mith, Kline & French Laboratories, Philadelphia

illin' T.M. Reg. U.S. Pat. Off.

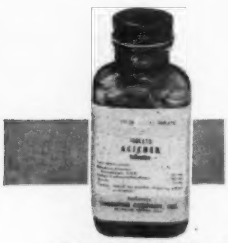


Introducing a new Valentine product...

for more effective control of gastric hyperacidity.
Particularly indicated in peptic ulcer, "heartburn" of pregnancy, gastric hypermotility, chronic dyspepsia and other functional indigestions.

acichek
VALENTINE

A combination of dihydroxy aluminum aminoacetate, N.N.R., sodium carboxymethylcellulose and glycine.



Supplied in bottles of 100 and 1000 tablets.

- acts almost immediately to give prompt relief from gastric distress
- maintains a desirable pH of gastric contents for hours with no depression of peptic activity
- produces neither secondary acid rise nor systemic alkalosis
- provides a mild, physiologic corrective of constipation
- easily and acceptably administered in tablets which require no chewing

VALENTINE COMPANY, INC.
Richmond 9, Virginia

THE NASHVILLE MEDICAL ASSEMBLY

(Formerly the Nashville Postgraduate Medical Assembly)

5th Annual Session

October 29-30-31, 1952, Nashville, Tennessee

HOTEL HERMITAGE

Guest Speakers

Ira A. Ferguson, M.D., Emory University, Atlanta, Georgia
"Management of Abdominal Injuries"

William D. Robinson, M.D., University of Michigan, Ann Arbor, Michigan
"Management of Rheumatoid State"

Joseph W. Reddoch, M.D., Tulane University School of Medicine, New Orleans, Louisiana
"Toxemia of Pregnancy"

Joseph A. Johnston, M.D., Henry Ford Hospital, Detroit, Michigan
"Endocrine Problems of Adolescence"

Edward F. Parker, M.D., Medical College of State of S. C., Charleston, S. C.
"Hemoptysis"

Albert L. Brown, M.D., Cincinnati University, Cincinnati, Ohio
"Recognition of Common Disorders of the Eye"

Laman A. Gray, M.D., University of Louisville Medical School, Louisville, Kentucky
"Sterility"

James Barrett Brown, M.D., Washington University School of Medicine, St. Louis, Missouri
"Early Care and Plastic Repair of Burns"

William Felix Mengert, M.D., Southwestern Medical School, University of Texas, Dallas, Texas
"Prolonged Labor"

Richard B. Capps, M.D., Northwestern University, Chicago, Illinois
"Diagnosis and Management of Diseases of the Liver"

George S. Mirick, M.D., Johns Hopkins Hospital, Baltimore, Maryland
"Management of Common Cold"

Condict W. Cutler, Jr., M.D., Columbia University, New York, N. Y.
"Surgery in the Aged"

Richard John Bing, M.D., University of Alabama School of Medicine, Birmingham, Alabama
"Indications for Cardiac Surgery"

Arthur Carlton Ernestene, M.D., Cleveland Clinical Foundation Hospital, Cleveland, Ohio
"Management Conjestive Failure"

Clarence S. Livingood, M.D., University of Texas, Galveston, Texas
"Recognition and Management of Common Disorders of the Skin"

Lectures, symposia, dinner by Nashville Academy of Medicine, annual banquet, entertainment and technical exhibits. Special entertainment at banquet by name celebrity.

(All Inclusive Registration Fee $15.00)

LADIES ATTEND WITH YOUR DOCTOR HUSBAND. BIG PLANS ARE IN STORE. LADIES INVITED TO ATTEND ANNUAL BANQUET.

Assembly concludes on evening before Vanderbilt-Washington and Lee Football Game—Tickets available

For further information concerning the assembly meeting and hotel accommodations, write: J. E. Ballentine, Executive Secretary, Nashville Medical Assembly, 647 Doctors Building, Nashville 3, Tennessee

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THE NASHVILLE ACADEMY OF MEDICINE
AND
THE DAVIDSON COUNTY MEDICAL SOCIETY

Piromen*

(DISPERSION OF DESACCHROMIN)

a new therapeutic agent for **HAY FEVER**

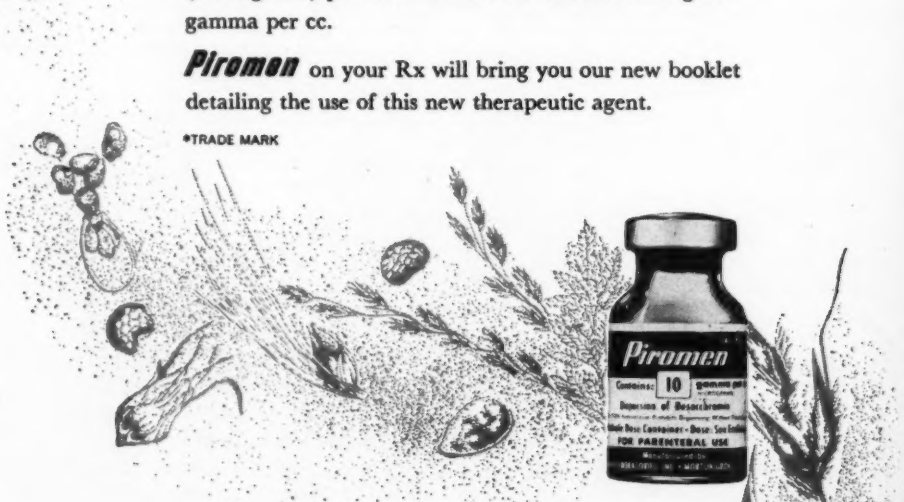
Piromen alleviates the immediate symptoms of pollenosis, and maintains effective control. Even cases which have failed to show improvement to desensitization and antihistaminics usually respond promptly to the administration of PIROMEN.

Piromen is also useful in the treatment of many other allergies and dermatoses.

Piromen is supplied in 10 cc. vials containing 4 gamma (micrograms) per cc. and in 10 cc. vials containing 10 gamma per cc.

Piromen on your Rx will bring you our new booklet detailing the use of this new therapeutic agent.

*TRADE MARK



MANUFACTURED BY

TRAVENOL LABORATORIES, INC.

Subsidiary of BAXTER LABORATORIES, INC., MORTON GROVE, ILLINOIS

dermatoses

eczemas

external ulcers

diaper rash

new, effective, faster, safer treatment

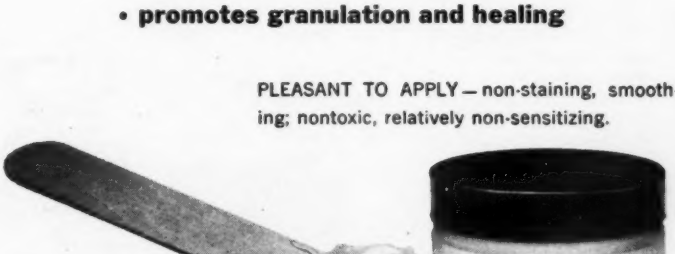
panthoderm
cream

first and **only** topical therapy to contain panthenol

CLINICALLY EFFECTIVE — new studies[1,2] show that topical panthenol (analog of pantothenic acid) "favorably influenced the course of various ulcerative and pyogenic dermatoses. A majority healed and many showed various degrees of improvement." Even long standing conditions resistant to other therapy seem to respond to Panthoderm Cream which . . .

- **relieves pain and itching**
- **promotes granulation and healing**

PLEASANT TO APPLY — non-staining, smooth-spreading; nontoxic, relatively non-sensitizing.



2 oz. and 1 lb. jars

Samples and reprints[1,2] on request

U. S. VITAMIN CORPORATION
Casimir Funk Laboratories, Inc. (affiliate)
250 East 43rd St., New York 17, N. Y.

Pregnancy–

PRECALCIN®
CAPSULES

Lactation

PATIENT-ACCEPTANCE assured because the colorful two-tone, easy-to-swallow capsules, plus the dry powder "fill", make PRECALCIN continuously agreeable to all patients. There is no fish-oil aftertaste.

DOSAGE: 1 PRECALCIN Capsule three times daily, or more as prescribed.

AVAILABLE: Bottles of 100, 500, and 1,000 capsules.

Each capsule contains:

Dicalcium Phosphate (Anhydrous)	0.45 Gm.
Bone Phosphate*	0.15 Gm.
Vitamin A (Ester)	2,000 U.S.P. Units
Vitamin D (Irradiated Ergosterol)	400 U.S.P. Units
Thiamine Hydrochloride	3.00 mg.
Riboflavin	2.00 mg.
Niacinamide	10.00 mg.
Ascorbic Acid	30.00 mg.
Ferrous Gluconate	45.00 mg.
*Fluorine content	0.07 mg.

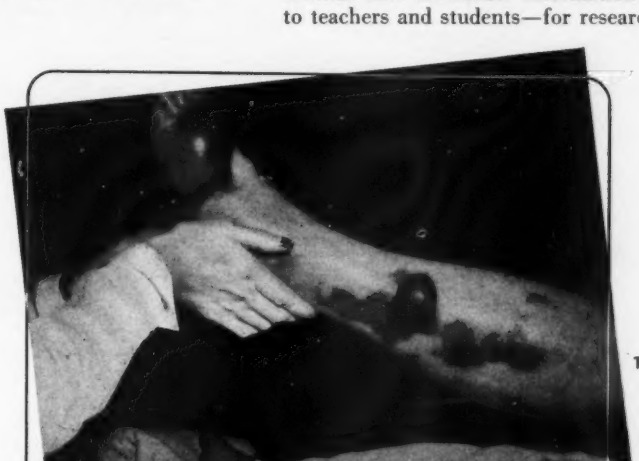
Walker LABORATORIES, INC.
Mount Vernon, N. Y.

Formerly Walker Vitamin Products, Inc.

Take it . . . *in color*

to show it as you saw it

No question later when you take it in color. All visible evidence—areas of infection, skin lesions, blood conditions—can be accurately recorded. That is why more and more hospitals and clinics are turning to color photography; why their photographic records offer invaluable information to physicians, to teachers and students—for research and review.



Thrombophlebitis

Take it . . . *with Kodak Color Film*

Easy to get brilliant color. Almost any camera with a properly color-corrected lens is a color camera when loaded with Kodak color film. No special equipment is required . . . no special exposure technic is needed. Just camera, film, and reliable light source.

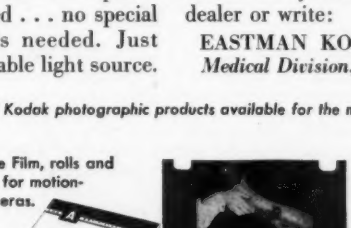
If you wish further information about Kodak color film . . . how to obtain duplicates, prints and enlargements—see your nearest photographic dealer or write:

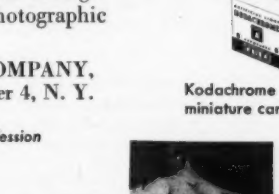
EASTMAN KODAK COMPANY,
Medical Division, Rochester 4, N. Y.

Kodachrome Film for miniature cameras.

A complete line of Kodak photographic products available for the medical profession

Kodachrome Film, rolls and magazines, for motion-picture cameras.





Kodak Ektachrome or Kodak Ektacolor Film, Type B, for sheet-film cameras. Kodak Ektachrome Roll Film—Nos. 120 and 620—for roll-film cameras.

Serving medical progress through Photography and Radiography

Kodak

Bromsulphalein Sodium

BROMSULPHALEIN SODIUM SOLUTION* is used as a test of liver function, especially in suspected cases of cirrhosis, malignancy, hepatitis, obstructive and arsenical jaundice. Normally the dye is removed rapidly from the blood stream by the liver, but in the presence of hepatic disease it is eliminated more slowly. The test is performed by injecting intravenously a test dose, after which the amount of dye retained in the blood is estimated colorimetrically by withdrawing a specimen of blood for comparison with a set of standards.

BROMSULPHALEIN SODIUM is supplied in 3 cc. size ampules containing a 5% sterile aqueous solution, packaged in boxes of 10. Colorimeter standards prepared from permanent dyes are also available.

Complete literature on request.

**H. W. & D. Brand of Sulfobromophthalein-sodium, U. S. P.*

HYNSON, WESTCOTT & DUNNING, INC.
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SOUTHERN MEDICAL JOURNAL

JOURNAL OF THE SOUTHERN MEDICAL ASSOCIATION

PUBLISHED MONTHLY BY THE SOUTHERN MEDICAL ASSOCIATION AT BIRMINGHAM, ALA.

Volume 45 SEPTEMBER 1952 Number 9

PROBLEMS ASSOCIATED WITH EMPLOYMENT OF HANDICAPPED PEOPLE IN INDUSTRY*

By C. U. DERNEHL, M.D.†
Texas City, Texas

At the turn of the century a great movement developed throughout the manufacturing nations of the world aimed at the goal of provision of security for man during periods of disability and hardship of a temporary or permanent nature. This new philosophy has developed by degrees in the intervening years, occasionally stimulated to frantic advancement by events having a profound effect upon the social structures of the country as a whole. One such series of events was the promulgation of industrial accident and sickness compensation laws. Another was the trend toward state administered social security which developed during the mid 1930's. The final impetus was provided by the release of thousands of partially disabled veterans following the last great war. After the bitter frustrations following the first world war it was recognized that provision must be made to provide the disabled veteran with some form of security.

Between the years influenced by the above major events, enlightened industrial management made attempts to provide greater security for the employee while still maintaining a secure financial position in highly competitive industrial fields. In the early years it was possible to offer but little aid. As the movement grew in extent, such programs became universally distributed throughout industry and it became possible to support security programs and still maintain a competitive position in the world's markets. In most major industries today it is no longer a question of provision of social security measures for employees but rather how far can these measures be extended without financial harm to the industry concerned. One of the most alarming features of the program's advancement is said to be the tendency of the employee to demand security provided by some agency at no cost to himself. It is felt that the resultant lack of social responsibility engendered by such a program can hardly be reconciled with sound economic thinking.

The rise of trade and industrial unions to positions of power has also played a vital role in the development of security programs. In the early years of unionism, activities were directed toward greater remuneration for work done and toward betterment of the working environment. Little attention was given to provision of security for the disabled employee. It soon became apparent that more money in the pocket was not the answer to greater employee social security. As a result there has developed an increased drive for so-called fringe benefits which include disability considerations and retirement plans.

No longer is it the major policy to work a good man at high wages until he can no longer do the job, to drop him from the payroll for a more able individual, and to let him seek his own financial security as best he may. Rather it is today the policy to recognize a sense of responsibility toward the employee who has been disabled or who has grown old in the service of an institution. There has developed an awareness that the partially disabled populace must have an opportunity to become gainfully employed or else be allowed to exist in miserable poverty on public welfare programs. A host of new problems has arisen with the development of this new concept. Not least among these is that of the employment of partially disabled persons.

The question of employment of handicapped veterans served to bring the problem into sharp focus. In past years industry had developed an awareness of the need to care for those employees injured in its service. Now industry was being asked to employ handicapped persons injured in the service of others.

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†Medical Director, Texas Plant, Carbide and Carbon Chemicals Company, A Division of Union Carbide and Carbon Corporation.

Many studies, well publicized and too numerous to mention, were made to show that properly placed handicapped people made good employees who were able to match production on a par with the non-handicapped. Both at home and abroad it was suggested that every industry be required to maintain a certain percentage of handicapped persons on its payroll. This rule is now in effect in England[1] where it has resulted in classifying many minor disabilities as handicaps so that an industrialist may comply with the law and still not be burdened with employees who cannot meet work requirements of a job. Such a program is obviously fallacious and is not a solution to the problem.

In discussing the employment of handicapped persons it would seem logical to include those disabled by both injury and illness. In most instances the determination of the employability of a rehabilitated injured man should be relatively simple. The problem hinges upon a matching of physical ability to the job available. It is logical to assume that in most instances the disability present at the time of employment is the maximum disability which will be presented. In the case of disease disability the problem is complicated by the fact that diseases are seldom static and may at any time present exacerbations making the employee temporarily or permanently unsuited to the job he holds. Such problems require a nicety of medical judgment that can be provided only by a skilful physician with an intimate knowledge of job requirements. The clinician is still handicapped by inability to predict the course of a disease process. It is likely that this shortcoming will remain unresolved and, in the last analysis, clinical judgment must remain the deciding factor.

The lack of adequate medical service in many industries is another factor in the employment of handicapped persons. Too frequently industry's medical service is provided by outside medical personnel who have little interest in the field other than the income it provides. Often these physicians have never seen the inside of the plant which they serve. In such circumstances it is usual that handicapped persons are rejected on pre-employment examination. At times they may be given a physical rating in which case the decision regarding employability is made by an employment officer who is not qualified by training to make employment decisions on questions that have a large medical component. If the employment officer and outside physician relationship is close and understanding, a satisfactory job placement program can be developed and made to work. However, it seldom proves as satisfactory as that which results when an in-plant medical service is provided.

The provision of adequate medical service is a "must" in the successful employment of individuals handicapped by illness. While it is possible to provide follow-up medical attention for handicapped employees on a private patient basis, results are more satisfactory if a physician well versed in industrial problems makes the ultimate decision regarding continued employability at any given job. The successful solution to this problem lies in measures to develop medical programs for small industry. Such programs are under development but still far from completion. It is suggested that another aid would be the establishment of industrial medical clinics as conducted in the state of Wisconsin. It then becomes possible for interested physicians to become familiar with industrial processes and problems.

Employability implies the availability of a job within the capabilities of the prospective employee. It is obvious that all industry cannot provide so-called "light jobs." The majority of information on the employment qualities of handicapped persons has come from the piece work or assembly line type of manufacturing industry, and it is likely that this type of industry can provide the greatest number of jobs for those with limited physical capabilities. A weakness in the philosophy that all industry should share equally in the employment of the handicapped lies in the fact that not all industries have available an equal proportion of jobs requiring limited physical activity. Heavy industry has few indeed, and feels that every effort should be made to fill light jobs with men disabled in its own service or with men reaching advanced years, after long periods of company service. Firms of this type understandably wish to care for their own before employing others of limited physical abilities.

With the recent emphasis on rehabilitation programs it has become possible to employ injured and ill persons previously considered unemployable. Properly conceived, rehabilitation is both physical and mental. It not

only develops a physical fitness to engage in gainful employment, but also teaches an individual to live within the limits imposed by his disability. Psychological adjustment is of utmost importance. Without this phase of the program a handicapped man will seldom make a good employee. With the advice of rehabilitation personnel to guide the industrial physician, it should be possible to place many more people in jobs within their physical capacity. It is possible to visualize the day when physicians interested in rehabilitation will become intimately familiar with job requirements and work closely with industry in the placement of the handicapped.

Not all handicaps are physical. There are a number of persons with mental illness of such nature that hospitalization is not required. Psychiatric therapy has advanced to the point where many persons previously requiring institutionalization are now able to return to society. It would be a mistake to say that all of these cases are normal persons. Many remain social problems throughout their remaining years. These persons must either find some form of work or become wards of some charity agency. The general experience of industry in the employment of these persons has not been favorable. Many mental disturbances tend to have remissions and exacerbations of varying degrees of severity.

While no general rule can be made it is a well established fact that the majority of schizophrenic psychoses have exacerbations. The acute depressions on the other hand may present an apparent complete cure. The severe psychoneuroses unless well resolved become a severe problem with repeated medical visits, high accident rates and frequent absences. Since the neuroses far outnumber the psychoses, it is easy to see how much of a problem they can become. It is discouraging indeed to see a psychoneurotic individual apparently become adjusted only to veer in another direction and once again become an employment problem. At present it would seem wise to view with suspicion the employment of an individual with a neurotic personality and a history of repeated courses of psychotherapy. Since such histories are almost impossible to obtain on most individuals during pre-employment examination, it would seem that we shall continue to be faced with a problem. Psychological testing may give the clue but only detailed investigation can give the solution to the present mental status of the prospective employee. Industrial medical personnel seldom has the time to devote to such investigations.

It has been my experience that mental cases create many employment problems. Fellow employees are not tolerant of symptoms of mental illness exhibited on the job. In spite of educational efforts there exists a definite fear of the mentally ill. Where such "peculiar" people can be worked in an isolated area with one or two understanding employees, the problem is apt to resolve into strictly medical phases. Where such a solution is not available, the deterioration of the morale of the working group may be such that the situation becomes intolerable. Generally speaking there is a definite risk associated with the employment of any person who has had a major psychotic episode. Until such time as psychiatry has advanced to the point where a more lasting and more complete rehabilitation can be assured, the employment of those who have had major mental illness must be regarded as a risky situation beset with many pitfalls.

One final factor, and probably the most common problem to be considered in the employment of the handicapped is that of claims for aggravation of pre-existing disabilities during current employment. In many states second injury laws protect the employer against unjust claims of total disability when he employs persons with missing members or parts of the body. In those cases where a part of the body is missing at the time of employment and subsequent injury results in loss of the remaining part, the employer is liable only for the current loss. The difference between the current liability and total disability is covered by the second injury fund. No such protection is available to cover claims of aggravation of pre-existing disabilities. The problem is well illustrated by the following case report.

This 28-year-old man was employed as an electrician's helper in January of 1947. Preplacement examination elicited a history of osteomyelitis of the right femur in 1940 which healed satisfactorily and caused no trouble in the ensuing seven-year period. Physical examination revealed no significant findings other than two large depressed scars over the area of the upper femur. Laboratory studies, including differential white blood cell count, were within normal limits. Re-examination in December of 1949 showed the same

findings with the additional notation of a deformity of the left second toe ascribed to an old injury. On January 10, 1951, the employee was engaged in erecting an electrical conduit line which required a certain amount of moderately heavy lifting and carrying. There was no history of a specific injury. That night he noted pain in the right hip region. This grew steadily worse and was finally reported to the medical department January 15, 1951. Examination at that time revealed nothing other than a complaint of aching in the right buttock. On January 18, 1951, the pain had become distributed over the sciatic nerve area. On January 23, 1951, he visited an orthopedist who had treated his osteomyelitis and a diagnosis of sciatica was confirmed. On his own initiative the employee sought chiropractic treatment without relief. On February 12, 1951, the man was re-examined and it was noted that he presented marked limitation of movement about the right hip joint. There was also tenderness over the scars from the previous osteomyelitis. A tentative diagnosis of osteomyelitis was made and confirmed by x-ray which showed an excavation in the greater trochanter of the right femur. After having been advised that this illness was not considered occupational in origin the employee elected to return to the surgeon who had treated him previously. In a letter dated February 17, 1951, this surgeon reported to the insurance carrier that in his opinion this osteomyelitis was reactivated by heavy lifting and straining. In a subsequent history reported to the insurance carrier it was stated that this man first had osteomyelitis in his left second toe in 1932 and that later in the year he developed osteomyelitis of the femur which required surgical drainage. He also had recurrences in 1940, 1943, and 1946. The initial illness and the last two recurrences were not reported in the medical history. Surgery performed in February of 1951 revealed the presence of granulation tissue but no pus in the area of rarefaction seen on x-ray. The area was debrided and antibiotics were administered with satisfactory healing. Six weeks later the man was returned to ground level work requiring no lifting or straining. The insurance carrier denied liability for the illness, but in a hearing before the Industrial Accident Board it was directed to assume the obligation. The obligation proved less than the cost of litigation and so it was paid.

As long as employers are faced with problems such as that illustrated above, it is difficult to see how one can expect a liberal attitude toward the employment of handicapped individuals. It is felt that it would be wise to adopt a policy whereby employers are protected against claims of aggravation by means of a fund such as the second injury fund now in existence in many states.

In all due respect to the fine work done by compensation boards, too frequently they are called upon to make decisions which should be made by a board of medical experts. In the above case it is highly doubtful that any true liability existed. This same individual did not hesitate to engage in vigorous sports involving far greater physical activity than that expended at his work. Yet he suffered no ill effects. It is probable that a group of impartial medical experts would have ruled that this illness was not compensable. This also serves to illustrate the fact that employer and employee alike must have the protection of skilled compensation boards comprised of medical experts from whose decision there should be no appeal. Without such protection reluctance to employ the handicapped is understandable.

CONCLUSIONS

In summary, the writer's feelings about the employment of handicapped persons are as follows:

(1) Every man should have the opportunity to earn a living at a job within his physical and mental abilities.

(2) Certain industries have been able to employ handicapped persons with notable success, but it is a mistake to assume that all industries can do likewise. Heavy industry tends to save jobs of low physical demand for persons handicapped or grown old in its own service.

(3) It would seem that the handicapped person can be employed best in an industry having a medical service well versed in job requirements and manufacturing processes so that complete follow-up care and consultation may be given.

(4) Not all handicapped persons make good employees. Those with major mental illness, notably of the schizophrenic group, nearly always remain, or become again, serious employment problems. The neurotic individual is always with us.

(5) Steps should be taken to protect employers against unjust claims for aggravation of disabilities. One method would be the establishment of a fund to cover such claims.

(6) For further protection of employer and employee alike, industrial accident boards should be comprised of a group of medical experts who could render opinions from which there would be no appeal.

(7) With the application of modern rehabilitation, careful and complete evaluation of the person, and the use of placement procedures that include careful fitting of the man to the job, it should be possible to provide

satisfactory employment to most handicapped individuals.

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DISCUSSION (*Abstract*)

Dr. R. Lomax Wells, Washington, D. C.—I am glad that Dr. Dernehl used the term "handicapped" rather than the narrower term, "physically handicapped" because the problem then comes into focus in its broadest and most realistic sense. Utilization of capacities of men and women with one leg or one arm, with one eye, with a stiffened joint or limited motion, has been the subject of much investigation and study and has been productive of real results from the point of view of workers as well as employers. Increasing attention is being given to non-traumatic handicapped: the cardiac, diabetic, the hard of hearing, the alcoholic, the epileptic and the emotionally disturbed worker.

I should like to limit my discussion to the problem of the emotionally disturbed employee and in so doing further limit it to the functionally disturbed so as not to include the organic psychoses.

Labeled "neurotic," the emotionally disturbed person has a hard time of it. His doctor is often "too busy" to give him the time he needs and so, too frequently he gets a prescription for a sedative such as phenobarbital and a "keep your chin up" five-minute pep talk, with a further recommendation on many occasions that he get away from his job for varying periods of time. I have no argument with this in many instances because it has produced satisfactory results, but let us be realistic. Does it answer any of these fundamental questions in many other cases?

(1) Why is the patient anxious, nervous, depressed?

(2) How can this basic problem be solved?

(3) Who pays the cost of such a program?

(4) Will such a program prevent similar recurrences?

(5) Who carries on at home and on the job during such an absence from duty?

(6) Does it give the patient any real insight into his problem in an effort to prevent further recurrences?

All too often I would say that the answer would have to be "no." Is this a job for the industrial medical department? Alone, I would say, "No," but in cooperation with the employee's personal physician and with his family, "Yes."

The emotionally disturbed employee does not become less disturbed by running away for awhile to return in a few weeks to the same problem. Away from home and the job he has a lot of time to think in irrational terms. He has no one close by in whom he can place his confidence and discuss his problem. He ofttimes is spending money that he can ill afford to spend, money spent at the expense of his family needs or taken from his savings accumulated for the future, or money provided by himself or his employer through some form of sickness plan.

I would suggest these approaches as a step forward in helping solve the problem of continued employment for these emotionally handicapped people:

(1) *On the part of the private physician.*—Development of consciousness of the need for the listening technic in handling these persons and a continuing effort to help them on the job and in the home wherever possible rather than off the job and away from home. (I realize that there are instances, we see them almost daily, where it is helpful to have them off the job for not too long a period of time.) Real appreciation on the part of the worker and increasing productiveness should result from this approach. An awareness on the part of the personal physician of the job requirements, home responsibilities and the balance between the two should help immeasurably. Merely to suggest that the patient leave his job for a period of time and not to offer any constructive approach to answering his problems at home while the employee's employer pays the bill is a totally unrealistic approach.

(2) *On the part of the industrial physician.*—The approach outlined above for the personal physician is equally applicable for the industrial physician. In addition, his knowledge of the employee's job and working conditions places him in the position of better understanding the employee's problem from the point of view of the job and thus being able to transfer to the personal physician information that can be helpful to him in the management of his patient. Management is often conscious of on-the-job conflicts. These conflicts may give rise to emotional disturbances for which the employee consults his personal physician but he does not always realize the conflict back of the emotional upset nor does he always call it to the attention of his physician.

(3) *On the part of the employee.*—Continuing development of a sense of responsibility toward his job and an awareness of the balance between job and home responsibilities. Development of a broader sense of values that will keep him from blaming the job for all of his symptoms.

(4) *On the part of the employer.*—Programs designed to diffuse through all levels of the organization an understanding of the human being as an individual and a clearer evaluation of employee attitudes with respect to job, supervision and fellow employees in a desire to move from the job and its environs those things which are responsible for unhappiness and dissatisfaction, emotional upheavals and poor production.

Throughout all of this, a real understanding of the vagaries of human nature, an understanding of the role of heredity, environment, religion, education and social background, must be factored into each approach.

I offer these thoughts not in a spirit of criticism of failure of any of the parties involved but with the hope that a sounder approach to the maintenance on the job of the emotionally disturbed worker may be established through the cooperative effort of all.

HAND DISABILITIES*

By F. L. FLACK, M.D., F.A.C.S.†
Tulsa, Oklahoma

Industry pays more for hand disabilities than for those in any other part of the body and many companies pay more for hands than for all other parts of the body combined. The medical director for a textile company in Rhode Island gave his statistics for injuries as 48 per cent for hand injuries, and 47 per cent for eyes, leaving only 5 per cent for hernias, backs, and all other disabilities.

An analysis of the records of the Industrial Board of Oklahoma shows that in 60,583 partial disabilities, 20 per cent were due to injuries and infections of the hand and that in 884 complete disabilities 58 per cent were due to the same cause. A stockyard plant in Chicago reports that 75 per cent of their hand disabilities follow infections and a large accident insurance company says that 20 per cent of its total hand liabilities arise from infections. Heavy industries are very much subjected to hand injuries. Over 60 per cent of all first attendances are for these conditions.

Handfield-Jones[1] cites the following figures from a heavy industrial plant:

Total number of employees	2,768
Total first attendances for all accidents	7,809
Total first attendances for hand injuries	4,668
Number of hands sent to the hospital	65
Number of those becoming severely septic	19

As industrial physicians we must first be interested in the prevention of this loss of man hours from work. The heavy expense to the company and of greater importance, the prevention of disability to such a wonderful instrument as the hand which is a perfect piece of machinery, must receive serious consideration. The frequency and seriousness of hand infections has not been given enough attention. Death from a hand injury and infection is rare but crippling is frequent and as a matter of fact is almost the rule.

The safety engineering departments have protected moving parts, guarded cog-wheels and belts and installed safety devices around moving machinery. This has resulted in a remarkable reduction of injuries. In many pieces of machinery the moving parts do not move until a certain act is employed by the worker, and when this act is no longer continued the movement stops. Safety hats and shoes especially in the oil industry have shown us many remarkable and life saving results.

The careful observation of employees by intelligent supervisors will show a reason for a similar type of accidents recurring in the same place a number of times. Some rough or sharp place or snag which continually injures hands needs to be corrected. Also, an observant supervisor will see that some employee is not fit or suited for the work he is doing and must be changed to another type of employment. The square peg must not be left in the round hole.

In many injuries, especially to the hands and eyes, the treatment received immediately before a physician can arrive is the most important and the one that prevents disabilities. The sulfonamides and antibiotics have by no means solved all the problems.

The figures quoted previously are so revealing that I quote Handfield-Jones' analysis of them.

"Among 2,768 employees there occurred 4,668 injuries to the hand of which only 65 needed to be sent to the hospital and of these 19 suffered severe sepsis. That is to say, in one year hand injuries amounted to 169 per cent of the total employees, but of these only 1.4 per cent needed hospital care and only 0.4 per cent became badly septic."

In heavy industry slight injury is extremely difficult to prevent but these figures are a lasting tribute to the first aid organization of the company.

Twenty years ago I had at all times on my service in the hospital three or more hand cases and at the present about half the time I have one.

Time will not permit an anatomical discussion, interesting as it is, of all the fascial and closed spaces and bursal infections, but some general principles apply to all.

It must be explained to superintendents that a half hour or an hour's time lost from work may save weeks of disability or loss of function to the hand of a valuable and skilled mechanic.

The injured employee should at once stop his work and report for first aid. Bleeding should be encouraged, as this is the best and only way to get damaging organisms out of the wound. All know that usually the first thing done is a frantic effort and the

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†Chief Surgeon, Sinclair Oil Companies.

use of all means to stop the bleeding, just the thing that should not be done. By bleeding I mean marked oozing continued for a few minutes. The hand is carefully and repeatedly washed with clean water and some antiseptic solution is applied. These antiseptic solutions are of very little value and serve mainly to insure the application of a clean dressing. The arm should be put at rest in a position of elevation and function. It is very important to place the hand in a position of function. Pain, throbbing, redness and tenderness indicates that a surgical condition has arisen. In practically all instances nothing is gained and conditions are made worse by trying to open or enlarge a puncture tract.

Aftertreatment is as important or more so than operative treatment.

Incisions are made only when pus is present and its location is certainly and definitely known. These incisions are quite well worked out and are made so as to secure adequate drainage without injury to important structures, particularly motor nerves and most particularly the motor branch of the median nerve which supplies all the thumb muscles except the adductors. This motor nerve is so located that it is very frequently severed and 60/200 of the hand destroyed. In addition to being the most valuable finger the disability amounts to 60 x $25.00, or $1,500.00 for permanent loss, plus perhaps $200.00 temporary loss in addition to the medical and hospital bills. An improperly placed incision may cost $2,000.00 and seriously damage a hand.

Antibiotics, of course, are used because most of the organisms are sensitive to them, but we must not let such aids prevent us from using skillful surgery.

In draining hand spaces complete anesthesia must be used. Local infiltration and freezing will not do. Inhalation anesthesia usually is best.

Down through the years I have used 1 per cent quinine and urea hydrochloride injected in the ulnar nerve where it can be felt at the inner posterior surface of the lower end of the humerus, injected into the median nerve beneath the palpable and visible tendon of the palmaris longus and into the radial nerve between the brachioradialis and the brachialis anticus just lateral to the tendon of insertion of the biceps. The radial is sometimes difficult to hit at this place but with practice it can easily be done. This drug is harmless when properly used. Hertzler[2] says:

"When this salt is injected into tissues an exudation is formed which is at first amorphous but soon coagulates forming a granular fibrin. This begins in a few minutes and is complete in from 12 to 24 hours. Tissue thus infiltrated is thickened and has a reddish color giving a superficial resemblance to round cell infiltration. It is not tender to touch as would be the case in an inflammatory reaction and sections show no round cells. The fibrin occupies the spaces between the connective tissue fibrils displacing them but not destroying them. This granular fibrin so produced is not organized into adult fibrous tissue but is absorbed after one or two weeks and the tissues remain in the state in which they were before the infiltration was made. When injected into the nerve sheaths the action is similar. The granular fibrin forms among the nerve fibers displacing and compressing them. No changes capable of being detected within the nerve fibers are produced."

This indicates that this solution can be safely injected into mixed nerves, as I have done hundreds of times. Anesthesia will last from several hours to two weeks. This anesthesia is of sufficient length to repair all the flexor tendons which, as you know, may require several hours. Also, the patient can to some extent extend the hand and thus the cut flexors may come into view. Very frequently and as a matter of fact in nearly all cases after hand surgery is done most skillfully, the fingers and hand remain swollen, red and soggy. The motion is seriously limited and then osteoporosis of a very disabling and permanent nature follows. This reflex vascular dystrophy has been much written about as the "shoulder-hand" syndrome. When these main nerves are blocked with quinine and urea hydrochloride this does not occur. This combination produces a long-lasting block of the sympathetic fibers. These sympathetic fibers come from the intermedio-lateral cell column, go out with the anterior roots, then to the sympathetic ganglia as pre-ganglionic white fibers and then as post-ganglionic gray fibers are distributed with the peripheral nerves. By securing this long acting, harmless anesthesia this hand syndrome is prevented. It has been one of the most helpful things to me in hand surgery.

Incisions are always made in a field rendered bloodless by elevation of the arm and the application of a blood pressure cuff pumped up to 250 mm. of Hg. Incisions are practically never made on the dorsum because pus is seldom found in this location. The swelling on the dorsum is great because

the lymphatic drainage is from the palm to the dorsum. Drainage is best made with gauze. Rubber is unfriendly to the closure of the wound and inhibits the coagulation of the wound exudate. We wish to avoid the accumulation of exudate and favor coagulation. The best foreign body to use is a wick of gauze. Rubber tissue and especially rubber tubing are used for drainage in areas where healing is to be prevented. Such material causes a tract and produces an exudation keeping the incision open and infected.

Gauze, on the other hand, is filled in with granular fibrin which is absorbed from the meshes in a few days.

In times past I have repeatedly written on the patient's chart that continuous hot packs, hot fomentations, hot boric acid packs, should be used or changed every three hours; and if they are consistently used I have nearly always succeeded in securing a swollen, soggy, motion limited, part wrinkled and furrowed and disabled hand. As to why I continued this practice of using an excellent culture medium when I saw the results every day I have no good explanation. The heat from wet packs certainly does not last more than two or three minutes. We learned long ago that warm moist packs used in the abdomen to pack-off intestines were deleterious in all ways, especially in wound healing. I always use dry abdominal packs. Anyone who thinks he injures peritoneum with dry packs should find how difficult it is to get peritoneal cells for study. Considerable effort is required to remove them. There is no evidence available to show that the reaction following drying may result in peritoneal adhesions. There are definite reasons to the contrary.

Dry heat should be used in hand cases.[3] Gauze is applied and in many instances may be impregnated with an antiseptic lubricant. Hot fomentations should be discarded. Healing and freedom from infection are promoted by dry heat. A convenient and usually available method is the use of electric light cradles. If facilities are available, and they usually are, ultra short wave diathermy and infrared rays are of the greatest benefit. Radiant dry heat from electric light bulbs is practically always at hand and in practice has been highly efficient.

The most common hand infection in my experience has been of the distal closed space. The peculiar anatomical arrangement of this space is of the greatest importance.

Radiating pieces of fascia extend from the palmar phalangeal periosteum to the skin dividing this area into fourteen separate compartments. A digital artery goes through the space on each side of the last phalanx. However, the entire phalanx is not shut off by these fibrous septa. The part which corresponds to the diaphysis is the closed space and the epiphyseal proximal part is the open space. When infection occurs in this closed space edema supervenes. Thrombosis of the veins follows and the blood supply is shut off. This results in destruction of the diaphysis and it occurs rather rapidly. This produces the usual signs of inflammation. The finger becomes red, hot and painful. The swelling is not great because dense fascial tissue everywhere surrounds this area. The pain is throbbing in character and pus is present. It must be remembered that a normal distal space fluctuates. This condition has been called a bone felon. However, the formation of it is not often due to a collection of pus starting beneath the periosteum but to a subcutaneous infection extending between the septa.

An early incision should be made to relieve the tension, to save the blood supply and to remove the sequestrum. Formerly, I made an incision on both sides and around the end of the distal phalanx of the finger, but this is not necessary and it leaves a groove after healing which often is painful. I now make the incision through all the septa on one side and put in a gauze drain. We must carefully bear in mind that a flexor tendon sheath is attached to the base of the distal phalanx and the incision must not extend far enough proximally to open this sheath. This might result in a purulent teno-synovitis and a crippled hand. New bone usually takes the place of the sequestrum. No longer are incisions made through the volar surface of a finger because they leave a tender scar on the pressure-bearing area destroying the efficient sensory plexus on the palmar surface. Midline incisions are not made anywhere on the fingers.

Radial Bursa.—The synovial sheath of the flexor pollicis longus tendon is quite extensive and is known as the radial bursa. This sheath runs beneath the short thenar muscles. It is involved usually as the result of infection of the thumb. Of importance in making the diagnosis is the discovery of a subcutaneous whit-

low or puncture wound of the thumb with the signs of inflammation. The thumb is held partially flexed because in this way the space in the sheath is increased to a maximum and this is nature's method of protection and to relieve pain. The thumb is enlarged. When the thumb is extended pressure on the inflammatory mass is increased and the pain is made worse. Pain and tenderness are present over the entire extent of the radial bursa. Swelling is present but is not so great as in thenar space infections. The edema over the back of the hand is less, for the reason that the lymphatic supply there is not so great or direct. Rupture through the proximal end of the bursa which frequently takes place empties the pus into Parona's quadrilateral space beneath the forearm flexors. For this reason the infection should be diagnosed and drained promptly. Drainage should be made by a lateral incision on the ulnar side, stopping 1½ inches below the distal palmar crease to avoid injury to the motor branches of the median nerve. This is not a good anatomical description of an incision but it is the best I know. The relation of structures varies and in the last hand I dissected all lumbrical muscles were bipennate instead of only the two lateral.

If the infection has ruptured through the proximal portion of the bursa into Parona's quadrilateral space an incision is made on each side of the forearm at the junction of the lower and middle thirds and just anterior to the radius and ulna and a through and through gauze wick drainage is placed.

Ulnar Bursa.—The deep and superficial flexor tendons of the fingers are covered by a common synovial sheath. This sac is the ulnar bursa and lies principally to the median side of the tendons. The most important portion is the retro-tendinous portion. The ulnar bursa is continuous with the synovial sheath of the little finger. It reaches, except for the little finger, from the last palmar crease to just below the anterior annular ligament. In most cases an infection in this space follows a little finger infection. The proximal ends of the radial and ulnar bursa communicate in 50 per cent of cases and the spread of infection from one bursa to the other is frequent.

The diagnostic signs are similar to those of the radial bursa being on the medial side. Anterior swelling is not prominent because of overlying tendons.

Thenar Space.—The thumb is the most important digit of the hand.[4] Rarely should the thumb be removed. Do not amputate the thumb regardless of how stiff or deformed it may be. It still has function. It can always be used as a point of opposition. This is not true of the other fingers which must frequently be amputated because they are in the way. Next to the thumb in value is the index finger. The diagnosis and treatment of infections of the thenar space are understood only as the anatomy in this region of the thumb and index finger is understood. The thenar space is on the radial side of the middle metacarpal. A definite septum extends from the middle metacarpal to the palmar fascia separating this space from the medial mid-palmar space. Posteriorly are the adductor obliquus and transversus muscles, in front are the flexor tendons, the palmar fascia, the flexor longus pollicis tendon and the short muscles of the thumb. This space extends to the lower border of the anterior annular ligament.

Infections of this space often follow penetrating wounds. They may be secondary to a mid-palmar space abscess or infrequently a radial bursitis. The most frequent cause however is the extension to this area of infection along the lumbrical canal of the index finger. The lumbrical muscles are surrounded by potential spaces or canals. Each lumbrical muscle arises from the tendons of the flexor profundus digitorum. The sheath surrounding the lumbrical muscle of the index finger communicates with the sheath of the index flexor tendon. The route the pus follows is that it ruptures through the proximal end of the sheath of the index finger, then goes into the space surrounding the lumbrical canal of this finger and then into the thenar space, the thenar space having an extension into it of the first lumbrical canal. The principle finding is extensive swelling of the thenar eminence. The extent of this swelling is greater than that of an infection in the palmar space because the fascia covering the thenar space is the thinnest portion of the palmar fascia. Edema on the back of the hand is extensive. This is because the course of the lymphatics is directly to the dorsum. Movements of the thumb and index finger in thenar abscesses are not very painful. The reason for this is that no tendon sheath is involved or distended with pus.

The treatment is incision and drainage. All the muscles of the thumb except the adductors are supplied by a motor branch of the median nerve. If an incision were to be made over the site of the greatest findings quite naturally the motor branch of the median nerve would be severed. This would be serious. It would mean that the patient would lose the most valuable part of his hand and would receive severe crippling and the industry would sustain a loss amounting to about $2,000.00, all because of a misplaced incision. A safe incision is made by using one dorsal and parallel to, and just to the radial side of, the second metacarpal bone. From this incision a hemostat is inserted over the adductors and drainage is established with a piece of gauze. This incision has the additional advantage of providing drainage for the dorsal thenar space which frequently becomes infected because pus extends over the outer side of the adductor transversus muscle. Such an incision leaves no scar on the palmar surface. Other incisions are described with measurements of centimeters, but the course of the median nerve is variable, as are other structures in the hand.

Limitation of time will not permit discussion of other infections which are important. The principle ones are subcutaneous infections of the fingers, and the rather rare midpalmar space infection. Lymphatic infections and traumatic loss of tissues and fractures are also frequent in my practice. Infection of the tendon sheaths is less frequent but the results in the cases that have come to my attention have almost universally been bad and crippling. This is due to the fact that it is almost impossible to drain these soon enough. They must be drained in the first few hours. The blood supply to tendons is poor, it is soon shut off and the patients do not come quickly enough to receive early drainage.

Most of my cases of tendon sheath infection down through the years have been caused by pieces of manila cable and more recently wire cable which puncture the transverse flexor creases where the fascia is thin and deficient. This weak spot is to allow movement of the joints. At this location the synovial sheaths actually herniate to just beneath the skin and thus are in the most favorable position to be injured by such a foreign body.

I know of nothing more interesting than the study of the anatomy of the hand, which may enable a physician to handle such cases without the terrible deformities and disabilities that frozen hands patients present.

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DISCUSSION (*Abstract*)

Dr. M. A. Connell, Picher, Okla.—It is amazing to note what a high per cent of injuries do occur to the hands. However, the hands are undoubtedly more exposed to injury than any other portion of the body. I was interested, after reading Dr. Flack's article, in comparing hand injuries to other injuries in zinc mining in the Tri-State area, and went through our file with that in mind. I found that in 1950 we had 1,806 injuries, and of this number 438 were hand injuries, 46 of which were infections. In other words, 24.6 per cent of all of our injuries were injuries to the hand and 2.6 per cent of all of the injuries were infections to the hand. I believe that this figure corresponds very closely to those quoted by Dr. Flack, and certainly it behooves us to make every effort possible to reduce the number of injuries to the hand by cooperating to the fullest extent with our personnel and safety departments. A program of education to the individual workman also is of utmost importance. It is always possible to place guards about the machinery, but it is very difficult to eliminate the human element in our accident experience. The 2.6 per cent of infections seems to me to be low and I agree with Dr. Flack that we definitely have seen a marked reduction in the number of infections in the last ten years. This is probably due to our educational program, which has taught our employees to report all accidents immediately, so that we are able to see a great number of these cases much earlier than we previously did.

One or two points, I believe, woud be of interest in the management of the severely injured extremity. First, we feel that these macerated wounds, which often include tendon and bone injuries, should be thoroughly cleansed with continuous saline irrigation, followed by complete debridement of tissue and the final closing of the wound. It has been our experience that these wounds can be closed tightly, and can be treated as closed fractures rather than compounded fractures, if the wound has been thoroughly irrigated and debrided. We have found the use of intramedullary pins in fractures of the metacarpals to be of marked benefit over any other previous type of fixation, since it allows much better immobilization without prolonged traction to the fingers. We have found the use of ice packing of an extremity, which has been badly macerated, to be of definite benefit in preventing the increased metabolism and, thus, necrosis. The cooling of the tissue aids in reducing the need for the increased blood supply, and often tissue

will live when otherwise it would have died because of the impaired circulation.

The blocking of the sympathetics in an effort to dilate the blood vessels is, as Dr. Flack stated, essential in saving these extremities.

Dr. Flack has made several very interesting observations in regard to his management of the infected hand. This is one of our chief problems and certainly results in marked disability in a great number of cases. The use of dry heat is certainly worth while; however, we have not been using dry heat and I believe that in the future we shall make an effort to do so. The incision for the drainage of the thenar space on the dorsum of the hand lateral to the second metacarpal is certainly another fine suggestion, and should result in much less damage to the median nerve fibers and to the palm itself. It has always been our practice to open these hands under general anesthesia with a tourniquet. Those who have not practiced this will find great satisfaction in the bloodless field and the completely anesthetized patient. I also feel that in opening these abscesses in this manner there is less likelihood of a blood stream contamination.

All of you, who are in industrial practice, know that hand injuries are one of our greatest problems. The hand is a complicated structure, and lends itself to many injuries and to severe disabilities. I should like to ask Dr. Flack three questions. One, concerning the use of 1 per cent quinine and urea hydrochloride in the anesthesia. We have had very little experience with this; however, it is my understanding that it takes some time before the anesthesia is complete, and I should like to know just what his procedure is in managing these cases in which he does do a nerve block preceding the operation upon the hand. In our part of the country, a number of us in the past have used McBride's formula in calculating disabilities to the hand. This, of course, necessitates a per cent of disability to the palm for any injuries which include two or more fingers. I should like to know whether or not Dr. Flack uses this formula for calculating permanent disability in the hand, and if not, does he allow any disability for the palm itself when two or more fingers are involved with no actual involvement of the palm proper. The third question is related to the late management of these cases. It has always been a problem to us. Just what is your routine procedure for this?

Dr. J. S. Chalmers, Sand Springs, Okla.—Hand injuries make up such a large portion of all injuries, that they become of major importance, even though the injuries for the most part are minor.

From one plant, over a 5-year period, out of a total of 5,570 accidents, 3,386 were to hands. Of these hand injuries only 12 were compensable because of some type of permanent disability resulting from the injury. In this series, there were no infections of consequence, due I feel certain, to the fact that all were seen within a few minutes after the injury and were carefully cleansed and repaired with antibiotics freely used. This series came from a heavy industry with good in-plant medical service.

On the other hand, injuries from a small packing house, which were 90 per cent lacerations of the hands by knife or bone, and were seen within a few minutes to 48 hours after the injury, show an infection rate of more than 50 per cent.

Comparison would indicate that early care in all hand injuries is of the utmost importance.

Dr. Flack (closing).—Dr. Connell and Dr. Chalmers have had extensive experience in hand disabilities, and it is interesting that their statistics so closely parallel mine.

The anesthesia from quinine and urea begins within a matter of two or three minutes or less. After the solution is infiltrated a wait of no longer than three minutes is necessary before starting the operation. Many years ago I did a series of hernia repairs with 1 per cent quinine and urea and after the injection was made I went ahead immediately with the incision. The great thing about quinine and urea is that the anesthesia lasts many hours.

In Oklahoma we do use McBride's formula for determining hand disabilities.

In the late management of these cases, it is very important that each patient should be taught that his hobby is recovery of function. The exercise must be active. Passive exercise or breaking down of adhesions is worse than useless. When one breaks down a few adhesions one creates many. The stiffer the joint the less passive exercise should be used. Active exercise under the supervision of a skilled physical therapy attendant is of inestimable value.

LOCALIZATION OF INTRACRANIAL NEOPLASMS WITH RADIOACTIVE DIIODOFLUORESCEIN*

By ROBERT DEAN WOOLSEY, M.D.†
GEORGE E. THOMA, M.D.‡
and
ROBERT E. MACK, M.D.§
St. Louis, Missouri

During the past one and one-half years, 114 patients suspected of having an expanding intracranial lesion have been studied with radioactive diiodofluorescein in an effort to determine whether or not a tumor was present preoperatively. As with any other diagnostic method, this procedure is not without its pitfalls and inaccuracies. Nevertheless, it seems to us after a study of these patients that the

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*From St. Louis University School of Medicine, St. Louis, Missouri.

†Instructor in Surgery.

‡(United States Air Force) Formerly Director, Radioisotopes Laboratory.

§Resident in Internal Medicine and Director, Radioisotopes Laboratory.

method does have certain definite value. Moore[1] and his associates at the University of Minnesota in 1947 reported their results with the use of fluorescein dye injected intravenously to determine the extent of tumor tissue at the operating table by the means of subjecting the exposed area to ultraviolet light after intravenous injection of fluorescein, the tumor tissue seeming to take up fluorescein to a greater extent than the surrounding tissue. Subsequently, Moore[2] and his coworkers reported their experiences with the use of radioactive diiodofluorescein in the preoperative diagnosis of intracranial neoplasms. Ashkenazy, Martin, and Davis[3] subsequently reported the high degree of accuracy with refinements in the use of this particular method of localization. In 95 patients they were able to localize correctly 86 or 91 per cent, and in only four patients were the preoperative conclusions completely inaccurate. There has been considerable argument and discussion about the accuracies and inaccuracies of this method. We have attempted to follow as closely as possible the operative procedure as outlined by Ashkenazy and his coworkers.

EQUIPMENT USED

Following is a list of the technical equipment needed to carry out this procedure: (1) end window Geiger-Muller tube* shielded with 1 centimeter of lead† (2) counting rate meter; and (3) graphic recorder, the Esterline-Angus ammeter type.

PROCEDURE

The patient is given diiodofluorescein containing 1.1 millicuries of radioactive iodine (I^{131}) intravenously. Fifteen minutes after injection the shielded Geiger tube is placed over any one of the standard positions and counting and graphic recording are begun. The record is then observed for the appearance of relative stability of the counting rate. This may be immediate, or a lapse of a half hour may take place before stability occurs. Once this stability is observed, a systematic survey of the cranium is begun. Thirty-two areas are examined routinely. These consist of fourteen bilateral and six midline areas.

The time for each determination depends upon the length of time needed for the counting rate to become stabilized with a consequent plateau on the graphic record. The plateau should persist for at least two minutes. Since a comparison of the contralateral sides for each position is important in the interpretation of the record, it is imperative that the sites be alternated from side to side. Any area with a suspicious counting rate difference is rechecked immediately and again at intervals during the procedure for evaluation. Persistence of a counting rate difference over the period of the test is felt to be necessary for diagnosis. We do not accept as abnormal one high counting rate determination without persistence of this difference in sides over a two and one-half hour period of time. The records are checked by one member of the group (formerly by G. E. Thoma, M.D.; now by R. E. Mack, M.D.) without ascertaining history, physical or neurological findings.

INTERPRETATION OF RESULTS

Table I gives a summary of the results of the radioactive diiodofluorescein tests in 114 patients. Of these, no tumor was demonstrated in 67 patients either by radioactive dye tests or any other test such as pneumo-encephalography, ventriculography, craniotomy, angiography, and so on, or by follow-up of the patient. There were twenty-four correctly localized tumors. Of these, two were pituitary tumors, one was an eighth nerve tumor, one was a hemangioma; there was one meningioma, and the remainder were in the glioma group. Six tumors were missed completely by radioactive dye localization. Two of these records were equivocal, but could certainly not be considered as definitely localizing a lesion. One of these was a pituitary tumor; the other five were in the glioma group. In nine individuals there was a positive radioactive dye

Total Number of Patients Examined	114
Normal records (no tumor demonstrated by pneumoencephalogram, ventriculogram or craniotomy)	67
Correctly localized tumors	24
Tumors not localized but found at craniotomy	6
Tumors localized but unconfirmed to date	9
Tumors localized but not found at operation	2
Subdural hematoma with normal record	1
Postoperative follow-up on tumor patients	2
Inflammatory process, both frontal lobes, incompletely localized	1
Tumors diagnosed but incorrectly localized	2

TABLE I

*The shielded Geiger-Muller tube is mounted on a special floating arm designed by the Dazor Manufacturing Company, St. Louis, Missouri.

†We are now using an R.C.L. bismuth cathode tube.

test which has been unconfirmed to the present. Some of these individuals had definite evidence of metastatic tumor but for one reason or another have not been subjected to air studies or further localization. Two other individuals had dye tests definitely indicating the location of tumor with negative air studies, and exploration revealed no tumor. These two individuals were explored during the early experience with use of the procedure, and we do not feel that such a mistake would be made at the present time after the use of the procedure has shown its limitations. A patient with a subdural hematoma, had a perfectly normal record. We have followed two patients postoperatively, and both have had normal dye tests and both are clinically without evidence of recurrent tumor. We have had an individual who had a positive localization in the left frontal lobe with indefinite localization by ventriculography to both frontal lobes; this patient at craniotomy turned out to have a nodular inflammatory process deep in both frontal lobes. In two individuals a diagnosis of tumor has been made and it has been substantiated at the operating table, but the localization of the lesion was imperfect.

Now if we consider only those patients in whom the tumors were correctly localized, or tumors not localized but found at craniotomy, we have a total of thirty patients, twenty-four correctly localized, six not localized, which gives us a percentage of accuracy in those patients with definite tumors of 80 per cent. If we consider those individuals with normal records (67), correctly localized tumors (24), subdural hematoma with a normal record (1), postoperative follow-up on tumor patients (2), and consider that the remainder of the patients, those tumors not localized but found at craniotomy and tumors localized but not found at operation, discarding those records unconfirmed to date, then we have an accuracy of 89 per cent. In other words, it is very difficult in interpreting a set of figures such as this to determine the absolute accuracy of such a method, but we feel that the range is definitely between 80 and 90 per cent.

Most of our errors were made during the first six months of experience with the procedure. During the last six months our accuracy has been about 90 per cent. Before that time we were a little too enthusiastic and as a result we were inclined to diagnose lesions too readily by the use of this method. In the last ten patients examined we have had one positive localization with a negative air study. This patient is still under observation. There have been four instances where the dye test has been the determining factor in the subsequent treatment of the individual.

Case 1.—A 13-year-old girl was admitted to the Missouri Baptist Hospital with a history of convulsive seizures. A dye test was run and this suggested a lesion in the right temporal region. A ventriculogram was perfectly normal. One month later the ventriculogram was repeated and at this time the child had a large filling defect in the right temporal region corresponding to the localization in the radioactive dye test.

Case 2.—A 58-year-old white man was first seen at De Paul Hospital with the chief complaint of aphasia and hemiparesis on the right side. This individual had a ventriculogram and a large cystic hemangioma was removed from the left temporal-occipital junction. The patient improved rather markedly over a period of about eight months. He began to get return of his speech and was able to be up and about walking. Arrangements were being made for some speech training for him when he suddenly became unable to swallow. He was returned to the hospital. Most of his original symptoms had returned; he had some difficulty moving his right arm and leg and his speech, what little had returned, had regressed. A ventriculogram was done which showed the ventricles pulled over, as we thought, to the left; there was some depression of the middle portion of the right lateral ventricle, but this was not too startling. After waiting two weeks, a radioactive dye test was done and this definitely localized the lesion in the right parietal region. The man continued to be unable to swallow and after a week, a right parietal craniotomy revealed a large expanding glioblastoma multiforme in the posterior parietal region on the right.

Case 3.—A 48-year-old white man was admitted to Firmin Desloge Hospital with the chief complaint of one convulsive seizure. The man's wife had recently been in the hospital and died following a generalized toxic brain involvement, the nature of which has not yet been determined. The man complained of no headache and his neurologic examination was entirely negative. Air studies were equivocal, although there was some suggestion of a right temporal lobe lesion. The dye test was definitely positive for a right temporal lobe lesion and at exploration we found a large meningioma lying on the tentorium posterior to the incisura.

Case 4.—A 6-year-old white boy developed a paralysis of the left arm and leg about two weeks before admission to the hospital; he had been comatose for several days before admission. Neurological examination showed the pupils dilated, the right greater than the left; the eye grounds were negative. There was a facial paralysis on the left. There was a paresis of the left half of the body and a Babinski on the left. Ventriculography and angiography were negative. A dye test was done which showed an increased rate

over the right temporal lobe anteriorly. At operation an astrocytomatous cyst was found in the temporal-frontal junction.

DISCUSSION

The accuracy of this method of localization of intracranial neoplasms will increase with the amount of experience in the use of the method. Our experience has not borne out that of Ashkenazy and coworkers in that we have not been able to predict with any degree of accuracy the type of malignancy of the tumor. This is possibly due to our inexperience with the method. We have had some metastatic carcinomas with high counting rates, but we have also had some metastatic carcinomas with rather low counting rates and not too significant differences between the two sides. Metastatic lesions characteristically are abnormal over only one counting area on either side or both sides. There are some pitfalls to the method that must be avoided. A high counting rate will usually be found during the period immediately after air studies have been done. So, if the test is to be of value, it should be done before air studies are carried out or at least a week or ten days should elapse after the air study has been done before an accurate test can be contemplated. Convulsive seizures will interfere with the test causing abnormally high counting rates as we found in a patient twenty-four hours following status epilepticus. We have had no opportunity to study a brain abscess. We have had a patient with a definite encephalitis with a normal record.

We have recently changed from the Gieger-Muller tube to the use of the bismuth-cathode tube, which is several times more sensitive for gamma radiation than the Gieger-Muller tube. In using the bismuth-cathode tube at the present time, we have not enough records to chart out all the normal areas with normal counting rates for each area. It would seem that the total count over any position using this tube compared to any normal would assume less significance than was definitely the case of the Gieger-Muller tube. The reason for this seems to be the increase in efficiency of the new tube which speeds up the running time of the procedures so that the prolonged elevation formerly seen in pathological records is not necessarily observed. We have adopted the practice of doing the records with a routine sequence of positions as advocated by Ashkenazy, but we feel that the positions to be checked first are those whose counting rate falls off more rapidly to the lower level, that is the 3, 4, and 5 positions and the occipital positions. The basilar positions, the 7's and 8's, are of a higher counting rate and remain high for a longer period of time. After experience with several normal records with patients selected at random, we feel that a counting rate difference of 90 or more is suspicious and worthy of further checking. It has been our practice to recheck the position at least twice and if the difference is persistent we recheck it at one-half hour intervals during the rest of the procedure. At the present time we feel that this is a valuable confirmatory method; we do not feel that intracranial tumors can necessarily be ruled in or out with the method, although if we have a normal record with this procedure a tumor is unlikely to be present.

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DISCUSSION (*Abstract*)

Dr. D. L. Tabern, North Chicago, Ill.—My function in connection with the paper of Dr. Woolsey has been that of directing the production of the tagged materials for brain tumor localization, and observing their use in various institutions throughout the country. I should like to confirm that, at the moment at least, the iodine tagged human serum albumin (IHSA) seems to have certain advantages over diiodofluorescein, namely: that a somewhat smaller dose is required, and that readings are made at the end of approximately twenty-four hours rather than very shortly after the administration. I am sure that the neurosurgeon will appreciate the opportunity to check upon readings or diagnoses which were not so clear as might be desired. Another advantage would seem to be a greater constancy of results. On the other hand certain groups have reported to me that they have found "right sided localization" which is probably associated with the accumulation of the tagged albumin in certain body organs.

Certainly at the present time, there is no need to go to a scintillation counter since these are notoriously difficult to keep operating under typical hospital conditions. There are now available bismuth cathode tubes which are some five to seven times as sensitive for gamma rays as the common end window tubes. However there have been difficulties in making their results uniformly reproducible.

Finally I should like to express my personal opinion that this is not the sort of a test which can be turned over routinely to a technician. Since abnormal readings can be due to any of several causes, it is necessary, or at least certainly highly desirable, that the neuro-

surgeon be on hand during the examination so that he can use his neurogical and physiological knowledge to answer such questions of interpretation, and to make additional readings necessary, while they may be still made with a good degree of accuracy. Finally this test is certainly not one which can alone give uniformally successful answers. I do feel that as the simplest and the safest of such diagnostic tests, it may well be set up as the initial test in those institutions equipped to handle radioisotopes, to be confirmed as necessary by the other procedures previously available to the neurosurgeon.

Dr. William S. Fields, Houston, Tex.—We have had an opportunity in Houston, during the past year, to work very closely with Dr. Moses Ashkenazy in his isotope localization studies. It is with some hesitation that I speak for him. His results have been reported as indicating a higher percentage of accuracy in diagnosis than in most other laboratories and I can only concur in these findings since I have seen most of the cases myself.

Probably the most important single factor in achieving such good results is Dr. Ashkenazy's opportunity to follow each case clinically as well as in the laboratory. A lack of knowledge of the history and physical examination is a handicap in laboratory diagnosis. It is not a valid criticism of any test that it is not sufficiently accurate in itself to make a diagnosis without the clinical data.

In addition, the availability of newer and more accurate counters and longer acting radioactive materials, such as iodinated serum albumen, have already enabled Dr. Ashkenazy to improve his technic, and we look forward to even better results in the future.

Dr. Thomas W. Farmer, Dallas, Tex.—At Dallas Veteran's Hospital and at Parkland Hospital during the past year, studies similar to those of Dr. Woolsey have been conducted by Dr. Henry Lanz, Dr. Ralph Clayton, Mrs. Carol Morgan, and me. One-hundred twenty cases have been studied. Our interests have centered about the possible usefulness of this method in tumor localization and also its use as a physiological method for the study of various types of cerebral disorders.

In cerebral neoplasms correct localization has been obtained in seventeen out of twenty-two cases. We have also observed occasional increased or decreased uptake of radioactive iodine in patients with nonneoplastic disorders.

RESULTS OF LOBOTOMY IN MENTAL DISORDERS*

By JAMES G. LYERLY, M.D.
Jacksonville, Florida

The operation of leukotomy was done by Moniz[1] in 1935, and it may be considered the forerunner of prefrontal lobotomy. Following his technic, Freeman and Watts[2] did the first leukotomy in this country in September, 1936. Soon after this the operation of prefrontal lobotomy was done, consisting of cutting the deep association pathways in the prefrontal lobes of the brain. The author[3] did his first open operation of prefrontal lobotomy in June, 1937. There have been many operations of prefrontal lobotomy since then with variations of operative technic. The principal ones to be mentioned are Freeman and Watts,[4] Lyerly,[5] Poppen,[6] Scarff,[7] and others.[8] A more selective operation was done by several workers, such as the infraorbital lobotomy of Freeman,[9] topectomy of Pool,[10] and the infraorbital undercutting of Scoville.[11] These procedures were devised to interrupt or remove the impulses from localized prefrontal areas and the infraorbital convolutions.

ANATOMICAL CONSIDERATIONS

According to Fulton[12] there are three primary divisions of the frontal lobes which lie rostral to the precentral motor cortex. These are the frontal areas, the orbital gyri, and the interior cingulate gyrus. They have connecting pathways with the anterior nuclei and dorsal median nuclei of thalamus and with certain nuclei of the hypothalamus. It has not been definitely determined whether the favorable results of lobotomy are concerned with the cingulate gyri, the orbital surface, or with the prefrontal areas. In the standard lobotomy there is interference with the connecting pathways of all of these areas, especially with the inferior and mesial fibers of the frontal lobes.

TECHNIC

The technic of prefrontal lobotomy has been described elsewhere, and it is essentially the same by us today as the operation performed first in 1937. The operation is by the superior approach, the point of entry being made about the middle of the second frontal convolution. The transverse cuts are made just in front of the sphenoidal ridge near the floor of the skull and in front of the anterior horn of the ventricle. Special effort is made to sever the inferior and mesial fibers. It has been done on both sides primarily, except in twelve cases, where the unilateral operation was performed which will be described later.

This study is based upon an analysis of cases of prefrontal lobotomy which have been

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done from 1937 to 1951. *Table 1* gives the total of cases for each year, and it shows that the number of lobotomies has increased since the end of World War II, which is probably due to the fact that more interest has been taken in the procedure for the relief of certain severe mental disorders. There were slightly more females than males, which was the usual experience with other workers.

In this group of 182 cases, there were three deaths, all occurring in the year 1950. The first death was in a woman, age 62, representing the one hundred thirty-fourth case in the series. The operation was done in January, 1950. The diagnosis was involutional melancholia, hyperthyroidism, diabetes and arteriosclerosis. She developed coma and postoperative hemorrhage, which was removed surgically, but she remained in a coma and died on the sixth postoperative day. It was felt that hyperthyroidism from previous removal of the thyroid gland, and the diabetes played a great part in her death. The second operative death was the one hundred forty-seventh case, a woman, age 25, having had numerous shock and convulsive therapies, the operation being done in May, 1950. The diagnosis was severe intractable anxiety neurosis with total diabetes. She went into a coma and died on the tenth postoperative day. The autopsy did not show any postoperative hemorrhage. The cause of death would seem to be diabetes. The third death was the one hundred fifty-sixth case, done in October, 1950, a male, 68 years of age, diagnosed as having severe senile depression arteriosclerosis and chronic nephritis; death occurred two days postoperatively. Autopsy showed severe pyelonephritis, bilateral, and thrombosis of the iliac arteries and aorta. No postoperative hemorrhage was found. This gives a mortality rate of 1.6 per cent, which is probably a little higher than it should be, since some of the cases selected in the more recent years have been poor surgical risks, and probably some of them should not have been done. It is interesting to note that in the first 133 patients who have had the prefrontal lobotomy operation since 1937 there was no mortality.

1937	11	
1938	15	
1939	8	
1940	6	
1941	8	
1942	9	
1943	9	
1944	4	
1945	6	
1946	6	
1947	14	
1948	13	
1949	23	
1950	30	
1951	20	(to July)
	182	

Males 84, females 98

TABLE 1

INDICATIONS

Prefrontal lobotomy relieves symptoms found in affective psychoses, such as severe mental depression, agitation, restlessness, suicidal tendency, nervous tension state, anxiety and apprehension. These symptoms are more frequently found in involutional melancholia and in manic depressive psychosis, and, therefore, the number of operations probably would be greater in these conditions. However, as will be shown later, the operation may be effective in severe anxiety and psychoneurotic depression, as well as in certain types of schizophrenia, even though they have been of long duration. We have found that there are certain types of severe, chronic manics who are hostile, assaultive and dangerous, and who have required restraint more or less constantly for ten or more years, who have responded well to the operation of bilateral prefrontal lobotomy. The indication for the operation is not determined by the clinical diagnosis as much as by the type of symptoms, as mentioned above. It is seldom that prefrontal lobotomy is done without the patient's having had electric shock or convulsive therapy which relieves the same symptoms as does prefrontal lobotomy. A favorable response to electric shock therapy, although temporary, may be considered as an added indication for the operation. The failure of a repeated series of electric shock therapy to maintain improvement may be considered sufficient indication for the procedure. Lobotomy has been done in some cases where convulsive therapy was not used because of severe cardiac damage, vascular hypertension, or arteriosclerosis. It is considered that the operation has less risk than repeated convulsive therapy in this type of individual. In recent years it has been found that severe intractable pain of physical or psychogenic type may be relieved by lobot-

omy, especially when there is fear and anxiety, and large doses of opiates are required.

Prefrontal lobotomy may be contraindicated in constitutional psychopathic individuals, and in severe organic degenerative disease of the frontal lobe as seen in senile dementia. It is believed to be contraindicated in the insane criminal and other individuals with anti-social habits. Chronic alcoholism is not believed to be a definite contraindication. Although the alcohol habit may persist, many of the symptoms which lead the individual to drink may be relieved. The age of the individual is not a contraindication, since many of the agitated depression and melancholia cases have been in the older age group, and they have obtained the best results. The oldest patient operated upon in this series was 78 years of age.

RESULTS*

In *Table 2* are tabulated the results of 182 cases according to the diagnosis and the degree of improvement. As mentioned previously in reports, the degree of improvement is indicated by group 1-4. Under group 1, the patients are greatly improved in that they have made a good adjustment and have been discharged from the hospital, and are able to remain at home and become employed. Under group 2 are the moderately improved cases who have also made considerable improvement and, for the most part, have returned to their homes but have not been regularly employed, although they are able to do so. Under group 3 are the slightly improved cases who are still in the hospital, or who are constantly under the care and supervision of an attendant. They are improved to the extent that they are not so much a problem to care for in the hospital. Under group 4 are the cases that are considered failures, in which there has been no appreciable degree of improvement. The largest number of cases were in the involutional melancholia group. Next were the schizophrenias, and after these the psychoneuroses and the manic depressive psychoses. There was one psychopathic feeble minded child, age 12 years, who was constantly agitated, restless, noisy, and was a disturbance to the other children in the institution. Although she remained an institutional case, it was easier to take care of her after the operation. There were two Parkinson's diseased cases with agitation, depression and nervous tension state. In this type of case, the mental depression symptoms may be greatly improved but the tremor may be only slightly improved. In groups 1 and 2 are the greatly and moderately improved cases, and it is to be seen that the majority of the cases are under these two headings. The greatest improvement is seen in involutional melancholia, psychoneurosis and manic depressive psychosis. In schizophrenia the moderately and slightly improved cases exceed the greatly improved.

A classification of schizophrenia has not been made in tabulating the results in this paper, but the cases selected for operation have usually been catatonic and paranoid types. Few hebephrenic and other types have been operated upon but with less improvement.

Not all of the patients operated upon were depressed, but as mentioned elsewhere, they were violent, excitable, restless, and in a constant manic state. Many of these patients had been in restraint most of the time for a period of ten to fifteen years. These cases were all in the Florida State Hospital. Some of them have shown remarkable improvement after the operation, most of them could be removed from restraints, and a few have been discharged from the hospital and become employed. A patient had been nicknamed "the old metal eater" because he was always eating nails, spoons, and other metals that he could swallow, in addition to twigs, wood, paper and any other foreign material which he could

*Forty-nine of these cases were done at the Florida State Hospital, Chattahoochee, Florida.

		Group I	Group II	Group III	Group IV	Total
Involutional melancholia	No.	41	12	16	3	72
	Per Cent	57	16.6	22.2	4.2	
Manic depressive psychosis	No.	10	8	7		25
	Per Cent	40	32	28		
Psychoneurosis	No.	20	5	3	2	30
	Per Cent	66.7	16.7	10	6.6	
Schizophrenia	No.	4	16	15		35
	Per Cent	11.4	45.7	42.9		
Intractable pain	No.	15	2			17
	Per Cent	88.2	11.8			
Psychopathic feeble minded				1		1
Parkinson's disease			1		1	2
TOTAL	No.	90	44	42	6	182
	Per Cent	49.5	24.1	23.1	3.3	

TABLE 2

get his hands on. He was constantly a problem, and had numerous abdominal operations for the relief of intestinal obstruction and for the removal of the various foreign bodies which he had swallowed. After the operation he was greatly improved, and no longer showed a tendency to swallow foreign material.

There have been tabulated in *Table 3* the cases done primarily for the relief of intractable pain. In addition to pain, there were various symptoms, such as nervous tension state, apprehension, depression and drug addiction. In this group there were 17 cases, all of whom showed considerable improvement, 88 per cent being in the greatly improved and nearly 12 per cent in the moderately improved groups. Some of the earlier cases in this group have been reported elsewhere. The relief of intractable pain by lobotomy has been recommended by Freeman and Watts,[13] Dynes and Poppen,[14] and Scarff,[15] Lyerly[16] and Grantham.[17] All of the cases of intractable pain had the bilateral prefrontal lobotomy, except in the series of Scarff, who prefers the unilateral procedure.

In summarizing the results in this series it is noted that the greatly and moderately improved cases were 73.6 per cent which should be sufficient reason to justify the operation. The slightly improved cases were 23.1 per cent, and although mostly institutionalized, they were less of a problem to care for after the operation. Only 3.3 per cent of the cases were regarded as failures.

Unilateral Operation.—Between 1939 and 1942 there were 10 cases of unilateral lobotomy operations. Since then, two more cases have been done in 1951, making a total of 12 cases of the unilateral procedure. In *Table 4* these cases have been summarized. It is seen that five cases had a second operation on the opposite side. Should the improvement be insufficient after several months with the unilateral operation, the procedure was usually done on the other side with further improvement in the majority of the cases. It is noted that the majority of cases obtained considerable improvement with the unilateral operation, and some of them returned home and were employed. The unilateral operation was started in an effort to prevent some of the undesirable symptoms from the early extensive bilateral procedure because some of them developed an unpleasant personality, laziness, lack of initiative, indifference, and a few became hypomanics. It was thought that an excessive amount of the prefrontal lobe areas had been disconnected by operating too far back. In 1939, the same operative procedure was done on one side in an effort to obtain sufficient improvement in the patient's mental condition, at the same time maintaining an intact frontal lobe on the other side, thereby preserving nearly a normal personality and initiative. Since some of these cases required a secondary operation on the other side, the unilateral operation was abandoned in 1942. In the subsequent years the bilateral operation was performed with a more anterior approach,

	Case	Sex	Age	Date	Diagnosis	Result
1.	G.L.P.	M	56	10- 4-47	Pain stump and drug addict	Gr. Impr.
2.	M.Y.	F	67	10-23-47	Pain stump	Gr. Impr.
3.	L.B.	F	49	6-23-48	Intercostal neuralgia, hypertension	Gr. Impr.
4.	L.M.	F	51	10- 1-48	Atypical facial neuralgia	Gr. Impr.
5.	A.J.B.	F	52	11-19-48	Carcinoma uterus, pelvis	Mod. Impr.
6.	W.R.	F	45	1- 8-49	Pain head, neck, arm, post cervical disc	Gr. Impr.
7.	L.E.	M	59	1-26-49	Pain stump L., peripheral vascular disease R.	Gr. Impr.
8.	J.H.	F	65	2-21-49	Carcinoma uterus and pelvis	Mod. Impr.
9.	B.H.	M	44	2-24-49	Traumatic headache, tinnitus, deafness	Gr. Impr.
10.	H.D.	M	36	3- 1-49	Carcinoma, rectum, bladder, pelvis	Gr. Impr.
11.	E.M.M.	F	57	3-26-49	Pain, spasmodic torticollis	Gr. Impr.
12.	S.P.	F	54	4-22-49	Atypical facial neuralgia	Gr. Impr.
13.	J.G.C.	M	37	5-21-49	Cancer pelvis	Gr. Impr.
14.	E.L.	F	47	11-27-50	Parkinson's disease, intractable pain, drug addict	Imp. Died one month
15.	M.B.	F	42	2-20-51	Hemiplegia, hypertension, intractable pain	Gr. Impr.
16.	D.R.W.	M	62	7-13-51	Osteoarthritis spine, intractable pain, depression	Gr. Impr.
17.	J.H.	M	48	7-13-51	Cancer lung, intractable pain	Gr. Imp.

TABLE 3

making a special effort to sever the inferior and mesial fibers. We were able to obtain more pleasing results in the majority of the cases. During this year there were two more cases of unilateral lobotomy, one of which has already required the second operation, while the other has had slight improvement and will probably need the other operation soon. It is believed that if the unilateral operation is performed, it should be done slightly more posteriorly than the conventional bilateral one. Should the second operation be required, the approach should be more anterior on the second side to preserve the frontal areas as much as possible.

Scarff did unilateral prefrontal lobotomy in a number of cases for the relief of intractable pain, and he feels that better results are obtained by doing the operation on the side opposite the location of the pain. In this series of cases of unilateral lobotomy for the relief of mental disorders, it did not make much difference whether the operation was done on the left or right side.

COMPLICATIONS

Immediately after the bilateral operation, the majority of cases will show mental confusion and impairment of memory requiring hand restraint to keep them from getting out of bed or pulling off the dressing. If the patient does not show these symptoms, it is Freeman and Watts' opinion that the operation probably has not been sufficient. The majority of cases did show a degree of mental confusion, while some of them were remarkably free of impairment of memory, yet free of the unpleasant nervous and mental symptoms for which the operation was performed.

Involuntary Sphincters.—About half of the cases showed involuntary urination, and a few, involuntary defecation. These sphincter disturbances were associated with mental confusion. With the improvement of the latter, incontinence likewise showed a tendency to clear up. As a rule, the incontinence lasted one or two weeks, and in a few cases several months were required for it to subside. In no case was incontinence a permanent postoperative complication.

Convulsions.—There were seven patients who had one or more convulsions after operation. This seems to be a small number, an incidence of 3.8 per cent. Other reports in the literature indicate that convulsions are

	Sex	Age	Duration of Symptoms	Diagnosis	Unilateral Lobotomy Operation Date		Hospital	Result
1. S.S.	F	39	9 mos.	Involl. melancholia	4/24/39	Left side	State hosp.	Great improvement, home
2. B.P.	F	53	16 mos.	Psychoneurosis, involunt. symp.	4/24/39	Rt. side	State hosp.	Great improvement, home
3. W.H.C.	M	42	7 mos.	Manic depress. phychosis, depressed	5/27/39	Left side	Private	Great improvement, home
4. G.S.	F	57	8 mos.	Invol. melancholia	5/27/40	Left side	State hosp.	Only slight improvement, state hosp.
					10/30/40	Rt. side	State hosp.	Only mod. improvement, state hosp.
5. E.F.	F	39	2 yrs.	Manic depressive psycho.	8/23/40	Left side	State hosp.	Only slight improvement, state hosp.
					11/22/40	Rt. side	State hosp.	Only mod. improvement, state hosp.
6. C.T.	M	35	14 yrs.	Psychoneurosis	12/20/40	Rt. side	State hosp.	Mod. improved, state hosp.
					10/29/41	Left side	State hosp.	Greatly improved, home
7. C.E.B.	M	67	6 mos.	Involutional melancholia	4/ 4/41	Left side	Private	Slight improvement
					10/31/41	Rt. side	Private	Greatly improved, home
8. G.L.P.	M	34	15 yrs.	Schizophrenia? Compul sympt.	4/ 7/46	Left side	Private	Mod. improvement, changed from chirop. to other work, home
9. W.C.Y.	M	46	2 yrs.	Involutional melancholia	4/25/41	Left side	State hosp.	Great improv., home, then recurred back in state hospital 6/24/48
10. C.F.C.	M	35	18 yrs.	Psychoneurosis	11/20/42	Left side	Private	Temporary improvement Then recurrence, home
11. H.K.S.	M	44	All life	Psychoneurotic depression	3/12/51	Rt. side	Private	Only slight improvement
12. M.C.W.	M	63	4 yrs.	Manic depressive	4/ 9/51	Left side	Private	Slight improvement
					5/11/51	Rt. side	Private	Moderate improvement

TABLE 4

more frequent. Most of the convulsions occurred in the earlier cases when electrosurgery was used to coagulate the cortical vessels. In the last eight or ten years it has not been used on the cortex, but the vessels are ligated with silk or controlled with silver or tantalum clips, and there has been a lessened incidence of convulsions. When they do occur, it is usually in the first few days after operation, and seldom appears over a long period of time. Most cases had a long series of preoperative convulsive therapy, which may be an additional factor for the development of convulsions.

A patient developed hemiplegia associated with senility and arteriosclerosis. The hemiplegia occurred on the day after operation, and reoperation failed to reveal any postoperative hemorrhage. It was thought that the diagnosis was cerebral thrombosis. This patient remained hemiplegic, and was later admitted to the State Hospital for institutional care where he subsequently died. Autopsy showed severe cardiac disease, arteriosclerosis, and softening with cavitation of the frontal lobes.

Three patients developed increased intracranial pressure with unconsciousness on the first or second postoperative day, which required a secondary operation for the removal of liquid hemorrhage and blood clots. These patients made a good recovery.

SUMMARY

Bilateral prefrontal lobotomy is the operation of choice for the relief of certain types of severe mental disorders when convulsive shock therapy fails, or is contraindicated. It is also effective for the relief of intractable pain with nervous and mental symptoms and drug addiction.

Unilateral prefrontal lobotomy may be done in the less severe and milder forms of mental disorder, especially in the young individual, when the least change of personality is desired.

The chain of symptoms relieved by the operation are those found with affective and emotional disorders, as depression, anxiety, fear, apprehension, agitation, suicidal tendency, violence, assaultiveness and impulsive behavior. Most of these symptoms are seen in involutional melancholia, agitated depression, manic depressive psychosis, anxiety and compulsion neurosis, and in certain types of schizophrenia.

Complications of a permanent nature resulting from the operation are minimal in the majority of the cases. With the proper selection of cases the operative risk should not be over 1 per cent. The first 133 cases operated upon in this series were done without a single death.

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OTITIS MEDIA WITH EFFUSION*

By J. DUDLEY SINGLETON, M.D.
Dallas, Texas

Otitis media with effusion may be defined as an inflammation of the lining membrane of the middle ear cavity and its extensions, the eustachian tube, mastoid antrum and mastoid air cells. It is characterized in uncomplicated cases by partial deafness of the conductive type and by the presence of non-

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*From the Department of Otolaryngology, Southwestern Medical School of the University of Texas, Dallas, Texas.

purulent fluid in the tympanum. If the disease is undiagnosed, untreated, or improperly treated, fibrosis, adhesions, and permanent impairment of the hearing may occur.

The tympanic cavity, the mastoid antrum, the mastoid air cells and the eustachian tube are joined to form a continuous group of air containing channels and spaces.

The eustachian tube runs from the upper anterior portion of the tympanum to its pharyngeal end in the lateral wall of the nasopharynx in a downward and inward direction. In the adult it is about 35 mm. long and is composed of an inner membranocartilaginous portion about 25 mm. long and an outer bony part about 10 mm. in length. The mucosa is continuous with that of the nasopharynx below and the typmpanum above. It is covered with ciliated columnar epithelium and contains many mucous glands in its cartilaginous portion. Attached to the cartilage are the dilator tubae and levator palati muscles. In close relationship to the cartilaginous portion of the tube are lateral pharyngeal lymph nodes. In infants and young children the tube is shorter, has a larger lumen, and is more horizontal than in the adult. The eustachian tube is the ventilating passage for the tympanum and mastoid cells; under normal conditions it is closed but it opens to allow air to enter the tympanum and its extensions with each swallow or yawn by the action of the dilator tubae and levator palati muscles. It also serves as a drainage channel for both normal and pathologic secretions from the middle ear and mastoid cells.

In general it may be stated that anything which contributes to swelling and closure of the eustachian tube may be a factor in the production of the disease. The more common etiological factors follow:

(1) Acute upper respiratory infections
  (a) Acute coryza
  (b) Acute sinusitis
  (c) Acute nasopharyngeal infections
  (d) Acute suppurative otitis media that has become sterile as a result of early chemotherapeutic treatment
  (e) Influenza, etc.
(2) Structural abnormalities of the ears, nose, and throat
(3) Enlargement of peritubal lymph nodes
(4) Nasal allergy
(5) Endocrine dysfunction
  (a) Hypothyroid
  (b) Hypopituitary
(6) Pregnancy
(7) Aerotitis
(8) Cardiac insufficiency
(9) Malignancy about tubal orifice

In otitis media with effusion, the disease process is not confined to the middle ear cavity; it also involves the eustachian tube and the entire mastoid cavity. This fact accounts for the rapid reappearance of fluid in the middle ear after some has been removed by inflation or aspiration following paracentesis. The fluid is usually sterile; it is usually a transudate; when it first appears, it is usually low in protein content and has a low osmotic pressure; if it is not evacuated, it gradually becomes thicker and more tenacious, and the protein content and the osmotic pressure increase. If the condition is not relieved, ulceration, deposition of fibrin, proliferation of fibroblasts, scar tissue and adhesions may replace the original fluid with permanent impairment of the hearing.

A tentative diagnosis of otitis media with effusion can be made with a high degree of accuracy from a careful history of each individual case. In most cases there is a history of an acute upper respiratory infection which preceded the onset of ear symptoms by a few days or even weeks. Impairment of the hearing and tinnitus in one or both ears are almost always complained of. The symptoms usually develop without pain; they develop rather suddenly, one day the ear or ears are all right, the next day the hearing impairment and the head noises are present and remain continuously. The patient may complain that his voice sounds as though he is talking in a well or barrel; he may hear or feel the fluid move in the ear on changing the position of the head; he may complain that the ear or head on the affected side feels heavy, full or blocked. Changes in the position of the head may result in marked temporary improvement of the hearing and relief from the discomfort. Often on arising in the morning the patient will be almost free of symptoms only to have the deafness and discomfort return as the fluid reaccumulates in the ear.

The diagnosis of catarrhal otitis media is not difficult in most cases to the otologist who is alert to the importance of a careful history and a thorough and complete ear examination in every suspected case. Examination of the hearing will always show impairment, rather marked in most cases. If the disease is not superimposed upon a pre-existing percep-

tive type of deafness, the hearing loss will be of the conductive type; one must not be led astray when the hearing tests reveal perceptive deafness. Inspection of the drum membrane always shows some loss of the normal lustre; it is usually retracted; the long and short processes of the malleus are usually chalky white in appearance; if examined carefully during the early stage of the disease there will be some congestion with varying degrees of dilatation of the small blood vessels. A fluid line, a meniscus, air bubbles or an amber discoloration of the membrane may be seen. If any one of these latter is present the diagnosis is established. However, in a very large percentage of cases the drum membrane will be so thickened or the tympanum will be so completely filled with fluid that one can see no fluid line, no meniscus, no bubbles, and no amber discoloration; in these cases one must resort to other measures in order to make a definite diagnosis. In cases of this type Hoople advises use of the ascultation tube while gently inflating the ear through a eustachian catheter. When this is done one can often hear the sound of fluid in the middle ear. For the past several years where the history of the case and the physical findings suggest the presence of fluid, it has been my practice to make a diagnostic puncture in the tympanic membrane. Before doing the paracentesis an attempt is made to sterilize the external canal by first cleansing it thoroughly then filling it with 70 per cent alcohol; the alcohol is kept in the canal with a large plug of cotton. In performing the paracentesis, I prefer to have the patient lying down. No anesthetic is required. The puncture method is used. The opening is made at the position of 5 or 6 o'clock in the right ear and 6 or 7 o'clock in the left ear, near the annulus. The incision is made at right angles to the radiating fibers of the drum membrane, if necessary the opening is extended; the direction of the incision is very important, in the above position the pull of both the radiating and circular fibers causes the cut edges to separate. If the incision is parallel to the radiating fibers the cut edges remain in apposition and it may be impossible to evacuate the fluid. After the incision is made the patient's head is elevated so that fluid may gravitate to the hypotympanum. Under direct vision a Siegle's type otoscope is used and gentle positive and negative pressure is applied. If fluid is present it will be drawn into the opening; if thin it will flow through the opening into the external canal, thus the diagnosis is established.

The prognosis in these cases is good provided the patient is seen early in the course of the disease. Early diagnosis and adequate well chosen treatment are usually followed by a prompt cure. In general it has been my experience that the longer the disease has been present the more difficult it is to clear up. In early cases one or two treatments will often suffice. However, one should always explain to these patients, and make it clear on the first visit, that the condition may be quite difficult to manage.

If maximum results are to be expected in the treatment of otitis media with effusion one must consider and correct, if possible, such underlying factors as infection in the nose and nasopharynx, nasal allergy, hypothyroidism, and so on. The local treatment of the condition should be adapted to the individual case. In many cases of short duration where a fluid line is present and the fluid is thin as shown by rapid change in position when the head is tilted forward and backward, aspiration of the fluid through a eustachian catheter will give the patient immediate, complete and often permanent relief. Aspiration is accomplished by anesthetizing and shrinking the orifice of the eustachian tube, inserting the catheter, holding it in place with the thumb and fingers of the left hand resting against the upper lip and tip of the nose and tilting the head forward, down and somewhat to the side with the affected ear up; in this position gentle, positive and negative pressure is applied with a 2-ounce all rubber ear and ulcer syringe. Aspiration of the fluid may be aided by having the patient swallow during the negative phase of the pumping procedure.

In those cases in which the fluid can not be aspirated, or when it returns after a second aspiration, or when the ear is completely filled with fluid, I favor paracentesis. Following paracentesis, if the fluid is thick, inflation of the eustachian tube and spot suction are definitely indicated. If the fluid is thin, I routinely inflate the tube and use gentle positive and negative pressure with a Siegle's type otoscope to evacuate it from the m ddle ear and its extensions; to prevent the return of fluid into the ear during this procedure, a fluffy pledget of cotton, which almost fills

the external canal, is placed in light contact with the incision; the head is tilted well forward, the face down, with the affected ear downward, and the pumping procedure is then applied. When the cotton becomes saturated, it is removed and another piece is inserted. The amount of fluid that can be removed by this method is often amazing; it is far more effective when the mastoid cells are involved than either spot suction or inflation. With the exception of temporary vertigo in an occasional patient, I have seen no ill effects from its careful use. If vertigo occurs the procedure should be terminated, but it may be used at a subsequent time. Results are usually most gratifying. In chronic cases that fail to respond favorably to treatment as outlined above one may consider making a large permanent opening in the tympanic membrane. If drainage persists after all of the more conservative measures have failed mastoidectomy should be considered.

COMMENT AND DISCUSSION

Otitis media with effusion occurs with considerable frequency. Hoople says that the condition occurs in approximately four per cent of his office patients. He believes that this percentage prevails rather generally throughout the country. It is by far the most common cause of impairment of the hearing which develops suddenly and without pain. If a definite diagnosis can not be established by other means, a diagnostic puncture should be done. The puncture should be followed by aspiration with a Siegle type otoscope. If no fluid is seen, the tube should be inflated with a eustachian catheter and an all-rubber bulb syringe. I have never seen complications result from such a puncture. The opening usually closes within 24 to 48 hours.

In the treatment of this condition I wish to stress the importance of the proper management of the underlying etiologic factor or factors. Attention must be given to nasal and nasopharyngeal conditions. Infection here should be cleared up; nasal polyps, if present, should be removed; sizable masses of adenoid tissue should be removed surgically; lymphoid tissue in and about the orifice of the eustachian tube should be treated with radium or roentgen ray. If allergy is a factor, the antihistamine drugs, desensitization, and other measures are indicated. If hypothyroidism is present, thyroid in adequate dosage should be administered.

In the local treatment, one should exercise extreme gentleness in catheterizing the eustachian tube and in applying mass suction to the middle ear after paracentesis; overzealous treatment here will produce direct or indirect trauma and prolong rather than hasten recovery. I have seen hemorrhage from the middle ear follow excessive suction with a pneumatic otoscope. Catheterization of the eustachian tube should not be repeated at too frequent intervals.

SUMMARY AND CONCLUSIONS

(1) Otitis media with effusion is not an uncommon disease.

(2) If a definite diagnosis can not be made from the history and a careful examination of the ear, a diagnostic puncture of the drum membrane is indicated.

(3) In the treatment of the condition, proper management of the underlying etiological factor or factors can not be too strongly stressed.

(4) In carrying out local treatment one should exercise extreme gentleness in catheterizing the eustachian tube and in applying mass suction to the ear.

(5) Catheterization of the tube should not be repeated at too frequent intervals.

VIRAL HEPATITIS FOLLOWING THE USE OF ULTRAVIOLET IRRADIATED HUMAN PLASMA*

By J. L. THOMPSON, JR., M.D.
Sylacauga, Alabama
and
W. D. SUTLIFF, M.D.
Memphis, Tennessee

Recent reports of transmission of viral hepatitis by ultraviolet irradiated plasma have appeared by Barnett, Fox, and Snavely;[1] James, Korns, and Wright;[2] and Rosenthal, Bassen and Michael;[3] Blecher;[4] and Greenlee, Terrill and Sloan.[5] These reports prompted

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*From the Infectious Disease Section of the Medical Service, Veterans Administration Medical Teaching Group, Kennedy Hospital, Memphis, Tennessee.

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an investigation at the Kennedy Veterans Hospital, Memphis, Tennessee, to study the incidence of viral hepatitis occurring between one and six months following infusions of irradiated plasma, non-irradiated plasma, whole blood, and combinations of the two types of plasma with whole blood. Until these reports appeared it was believed that the hazard of developing viral hepatitis as a result of plasma infusion might be eliminated by irradiating the plasma with ultraviolet rays. This belief followed a report by Oliphant[6] in 1944 and by Oliphant and Hollaender[7] in 1946 indicating favorably the value of ultraviolet irradiation as a method of sterilizing human plasma and thereby preventing the transmission of homologous serum jaundice. Further work was reported in 1948 by Blanchard and co-workers,[8] who performed the following experiment: portions of the same known icterogenic plasma, some irradiated and some non-irradiated were injected into volunteers. Of 15 volunteers receiving 4 cc. of non-irradiated plasma intramuscularly, overt or presumptive hepatitis developed in seven. Of eleven volunteers receiving 7 cc. of irradiated plasma, none showed clinical or laboratory evidence of the disease. MacCallum[9] reported in 1946 two experiments which gave contrary results inasmuch as the supposedly suitable exposure to ultraviolet rays failed to inactivate the virus in human serum.

The Kennedy Hospital became a Veterans Administration facility in 1946. Between March 26, 1947, and April 8, 1949, a total of 1,277 units (250 cc. per unit) of non-irradiated plasma was supplied. From April 8, 1949, until January, 1951, a total of 2,061 units (250 cc. per unit) of irradiated plasma was supplied. Between January 1947 and January 1951, a total of 13,567 units (500 cc. per unit) of whole blood was supplied. The records of 182 cases of viral hepatitis were reviewed. There was evidence that either blood or plasma or both had been administered one to six months before onset of hepatitis to 39 of the cases (21.5 per cent). Four cases of viral hepatitis occurred from 62 to 112 days following administration of irradiated plasma alone and four cases occurred from 64 to 164 days following administration of irradiated plasma and whole blood. During the interval of one to six months following an infusion, there were three cases following non-irradiated plasma, eight cases following non-irradiated plasma and blood, and 20 cases following blood alone. No attempt was made to follow all patients who received these infusions to determine whether they developed hepatitis. Only those patients who developed hepatitis while still in the hospital because of the original illness or returned to the hospital because of hepatitis are included. Obviously an unknown number of cases probably developed hepatitis after discharge from the hospital and did not return, but the number is probably quite small, especially for the severe cases of hepatitis since hospitalization is without charge.

Table 1 indicates the number of various infusions and the frequency of hepatitis within one to six months following these infusions.

The following is a presentation of the four cases of viral hepatitis treated at the Kennedy

Type of Infusion	Interval when Supplied	Units 1 Plasma=250 cc. 1 Blood =500 cc.	Number of Hospitalized Hepatitis Cases Following Infusions			Ratio of Hepatitis Cases to Units of Infusions
			Plasma or Blood Alone	Plasma and Blood	Totals	
Irradiated plasma	April 8, 1949 to Jan. 1, 1951	2,061	4	4	8	1:258
Non-irradiated plasma	March 26, 1947 to April 8, 1949	1,277	3	8	11	1:116
Blood	Jan. 1947 to Jan. 1951	13,567	20	12	32	1:424
Totals			27	12*	39*	

*Cases receiving both plasma and blood entered twice in column above but only once in this total.

TABLE 1

Veterans Hospital occurring from 62 to 112 days after administration of 500 to 1,000 cc. of irradiated plasma.

Case 1.—J.W.M., a white man aged 52 years, was admitted on March 9, 1950, a few hours after being struck in the abdomen with a board. A perforation of the distal portion of the jejunum was closed at operation, during which the patient received 500 cc. of irradiated plasma. The subsequent hospital course was uneventful, except for a pelvic abscess on the third postoperative day which was incised and drained. No blood transfusion was given. The patient was discharged on March 27, 1950. Sixty-six days after receiving irradiated plasma the patient developed nausea, vomiting and jaundice and was readmitted five days later on June 20, 1950. The skin and sclerae were obviously icteric. The liver was not palpable. Liver function studies on admission revealed serum bilirubin 12.2 mg. per cent; (10) thymol turbidity 33.6 units; cephalin flocculation 2+ at 24 hours and 3+ at 48 hours; prothrombin time 18 per cent. The patient received infusions of glucose, protein hydrolysate, vitamin K, crude liver extract, penicillin, and a diet of carbohydrate 350 grams, protein 150 grams and fat 100 grams. Death occurred on the fifth hospital day. The final anatomical diagnoses following postmortem examination were: acute hepatitis; lobular pneumonia, terminal; and encephalomalacia.

Jaundice occurred 66 days following the administration of irradiated plasma. The presence of hepatitis was established at postmortem examination.

Case 2.—L. G., a colored man aged 30 years, was admitted on July 15, 1949, one hour after receiving a stab wound of the right forearm. He received no medication prior to admission. On admission he received 500 cc. of irradiated plasma followed by prompt subsidence of symptoms of shock. No additional infusion was given. The wound was sutured and the patient discharged three days later. Other medications consisted of 1,500 units of tetanus antitoxin and procaine penicillin. Seventy-four days after receiving irradiated plasma the patient developed malaise followed by jaundice and dark urine and 10 days later, on October 9, 1949, he was readmitted. He had received no injections since the last admission. Liver function studies revealed serum bilirubin 16.2 mg. per cent; (10) thymol turbidity 22 units; cephalin flocculation, 2+ at 24 hours and 3+ at 48 hours. Bromsulfalein 15 per cent retention 45 minutes after intravenous injection of 5 mg. of the dye per kilo body weight. The serum test was positive for syphilis. Multiple stool examinations were negative. The patient received bed rest and a diet of carbohydrate 350 grams, protein 150 grams and fat 100 grams, followed by an uneventful recovery.

Symptoms consistent with viral hepatitis began 74 days following the administration of irradiated plasma.

Case 3.—N.A.M., a white man aged 54 years, was admitted on July 15, 1949, because of a perforated duodenal ulcer. During the emergency operation at which the duodenal perforation was closed, the patient received 500 cc. of irradiated plasma. He received no blood. The postoperative course was uneventful. He was discharged on August 18, 1949. One hundred and twelve days after receiving irradiated plasma the patient developed dark urine followed by nausea, vomiting, and jaundice and was readmitted three weeks later on November 28, 1949. There was obvious icterus to skin and sclerae, with liver palpable 5 cm. below the right costal margin, and tender. Initial liver function studies revealed serum bilirubin 12.2 mg. per cent; (10) thymol turbidity 36.5 units; bromsulfalein 20 per cent retention 45 minutes after intravenous injection of 5 mg. of dye per kilo body weight; cephalin flocculation 3+ at 24 and 48 hours. The patient received complete bed rest and a peptic ulcer diet consisting of carbohydrate 350 grams, protein 150 grams and fat 100 grams, followed by an uneventful recovery.

Symptoms consistent with viral hepatitis began 112 days following administration of irradiated plasma.

Case 4.—W.L.M., a white man aged 33 years was admitted on June 13, 1950, with a history of receiving 600,000 units of penicillin daily for three days beginning 10 days prior to admission. Two days prior to admission there was generalized urticaria and on the day of admission there was marked vomiting and diarrhea. Physical examination on admission revealed a comatose patient with systolic blood pressure zero and generalized urticaria. All laboratory studies and a chest film were within normal limits. On admission the patient received 1,000 cc. of irradiated plasma, in addition to glucose and saline infusions, epinephrine and benadryl.® There was an uneventful recovery followed by discharge on June 29, 1950.

The patient remained well until 62 days after receiving the irradiated plasma when he noted icterus of sclerae, dark urine and nausea. He was readmitted six days later on August 21, 1950, at which time physical examination revealed icterus to skin and sclerae. The liver was not palpable or tender. Laboratory data revealed bromsulfalein 20 per cent retention 45 minutes after intravenous injection of 5 mg. of the dye per kilo body weight; serum bilirubin 6.8 mg. per cent at one minute and 8.2 mg. per cent total; and cephalin flocculation 2+ at 24 hours and 48 hours. The patient received bed rest, crude liver extract and diet consisting of carbohydrate 350 grams, protein 150 grams, fat 100 grams, followed by an uneventful recovery.

The jaundice appeared 62 days following administration of irradiated plasma. The hypodermic injections of penicillin must be considered as a possible source of viral infection in this case, since the technic is unknown by which the needles for these injections were sterilized.

The following is a presentation of four cases of viral hepatitis treated at Kennedy Veterans Hospital occurring from 64 to 164

days after administration of irradiated plasma and blood.

Case 5.—J. T., a white man aged 59 years, was admitted on March 28, 1949, and discharged on June 23, 1949, with the diagnoses of hypertensive cardiovascular disease, cardiac enlargement, myocardial insufficiency, Class II, and anemia, secondary to nutritional deficiency for which he received folic acid and crude liver extract. He was readmitted on January 4, 1950, with the diagnoses of chronic cholecystitis with cholelithiasis, and chronic pancreatitis in addition to the previous diagnoses. On March 27, 1951, a cholecystectomy and choledochojejunostomy were performed at which time the gallbladder showed slight signs of infection manifested by edema around the cystic duct and a few filmy adhesions. Stones were found in the gallbladder lumen. Five hundred cc. of irradiated plasma were given on March 27, 1950, and April 7, 1950. Fifteen hundred cc. of whole blood were given between April 6, 1950, and May 26, 1950. The patient was discharged on June 19, 1950.

One hundred and fourteen days after receiving the initial infusion of irradiated plasma and one hundred and four days following the initial administration of blood the patient developed jaundice, malaise and nausea and was readmitted two weeks later on July 8, 1950. Physical examination revealed obvious icterus to skin and sclerae. Laboratory studies revealed serum bilirubin 2.3 mg. per cent; total white blood count 5,600, neutrophils 70, lymphocytes 30. Other liver function studies were within normal limits. The patient remained afebrile throughout the period of hospitalization. No antibiotics were given. On a regimen of bed rest, vitamins, methionine and diet consisting of carbohydrate 350 grams, protein 150 grams and fat 100 grams, there was an uneventful recovery with discharge on August 3, 1950.

Jaundice appeared 114 days following the initial administration of irradiated plasma, and 104 days following the initial administration of blood. No signs or symptoms consistent with pyogenic infection or common bile duct obstruction were noted. Viral hepatitis was considered the most probable diagnosis.

Case 6.—J.E.M., a white man aged 52 years, was admitted on November 28, 1949, and discharged on February 6, 1950, after receiving a right pyelonephrolithotomy on January 4, 1950, and a right nephrectomy on January 27, 1950. Sixty-five hundred cc. of whole blood were given between January 14, 1950, and January 28, 1950. Two thousand cc. of irradiated plasma were given between January 27, 1950, and January 28, 1950. He was readmitted for evaluation of urologic status on May 10, 1950, and discharged 24 hours later. One hundred and sixty-four days after receiving irradiated plasma and whole blood and 187 days after receiving initial whole blood transfusion, the patient developed malaise, nausea, clay colored stools, dark urine and jaundice and was readmitted one week later on June 17, 1950. There was icterus to skin and sclerae with liver slightly enlarged and tender. Liver function studies revealed serum bilirubin 3.0 mg. per cent; bromsulfalein 20 per cent retention 45 minutes after intravenous injection of 5 mg. of the dye per kilo body weight; cephalin flocculation 3+ at 24 hours and 48 hours. The patient received bed rest, vitamins, crude liver extract and diet consisting of carbohydrate 350 grams, protein 150 grams and fat 100 grams followed by an uneventful recovery and discharge on October 6, 1950. He returned for evaluation of urologic status and liver function on November 1, 1950, and was discharged 48 hours later clinically well.

Symptoms consistent with viral hepatitis began 164 days after the patient received irradiated plasma and whole blood and 187 days after he received the initial whole blood transfusion.

Case 7.—R.E.B., a white man aged 52 years, was admitted on February 22, 1950, and discharged on April 3, 1950, after receiving a radical cystectomy and bilateral ureterosigmoidostomy for a Grade II transitional cell carcinoma of the urinary bladder. Between February 26, 1950, and March 9, 1950, he received a total of 4,500 cc. of whole blood and between March 3, 1950, and March 9, 1950, a total of 4,500 cc. of irradiated plasma. He was readmitted on April 18, 1950, and discharged on April 28, 1950, after a colostomy had been performed. He returned on May 17, 1950, for evaluation of colostomy and urologic status and was discharged on May 26, 1950. Ninety days following the initial infusion of irradiated plasma and 97 days after the initial blood transfusion, malaise and fever were noted and he was readmitted 48 hours later on June 4, 1950, with temperature 100, icterus of skin and sclerae, and a colostomy. The liver was not palpable or tender. Liver function studies revealed serum bilirubin 5.6 mg. per cent; cephalin flocculation 3+ at 24 and 48 hours; bromsulfalein 20 per cent retention 45 minutes after intravenous injection of 5 mg. of the dye per kilo body weight. The patient received crude liver extract, methionine, vitamins, bed rest and diet of carbohydrate 350 grams, protein 150 grams and fat 100 grams, followed by an uneventful recovery and discharge on August 11, 1950. He was readmitted on October 31, 1950, for operative closure of the colostomy and on two subsequent occasions because of a urinary infection and suprapubic abscess. On the last three admissions there were no symptoms referable to liver disease and liver function studies were within normal limits.

Symptoms consistent with viral hepatitis began 90 days after the initial infusion of irradiated plasma and 97 days after the initial blood transfusion.

Case 8.—D.H.B., a white male aged 39 years, was admitted on May 6, 1950, because of nausea, vomiting, malaise and jaundice of six days' duration. Sixty-four days prior to the onset of these symptoms he received 500 cc. of irradiated plasma and 500 cc. of blood in a local hospital in Memphis, following an auto accident during which he received severe lacerations of scalp. There was a slight icterus to the sclerae and skin with liver palpable 3 cm. inferior to the right costal margin, and tender. Liver function studies revealed serum bilirubin 1.8 mg. per cent and bromsulfalein 20 per

cent retention 45 minutes after intravenous injection of 5 mg. of the dye per kilo body weight. An oral cholecystogram was within normal limits. The patient received bed rest and a diet of carbohydrate 350 grams, protein 150 grams, and fat 100 grams, followed by an uneventful recovery and discharge on May 26, 1950.

Symptoms consistent with viral hepatitis began 64 days following the administration of irradiated plasma and blood.

GENERAL DISCUSSION

The problem of establishing a diagnosis of homologous viral hepatitis in any single case is well known. In view of the clinical course, the laboratory findings, the incubation periods varying from 62 to 164 days and the autopsy findings in one case, the diagnosis of viral hepatitis and its probable homologous origin from administered irradiated plasma in four cases and irradiated plasma with blood in four cases appears reasonably certain. Another possible source of infection, namely penicillin injections, was mentioned in Case 4.

A decrease in the incidence of viral hepatitis has occurred relative to the total amount of plasma supplied to the hospital in our experience following the use of irradiated plasma as indicated by *Table 1*, but cases still occur following infusion of irradiated plasma when no infusions of blood are given.

SUMMARY

(1) Four cases of viral hepatitis following infusion of irradiated plasma and four cases following administration of irradiated plasma and blood are presented with incubation period varying from 62 to 164 days.

(2) The substitution of infusions of plasma irradiated with ultraviolet rays as currently practiced for infusions of non-irradiated plasma led to some improvement but did not entirely prevent the development of homologous viral hepatitis at the appropriate interval after plasma infusions.

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PROBLEMS IN ANESTHESIA FOR INTESTINAL OBSTRUCTION*

By ROBERT B. DODD, M.D.
Dallas, Texas

A condition which illustrates one of the "Special Problems in Anesthesia as Imposed by Pathological Physiology" is acute intestinal obstruction. The purpose of this paper is to review some of the changes in physiological mechanisms that may result from the presence of intestinal obstruction and relate these changes to the choice of anesthesia for operation upon such cases. The problems of fluid balance will be touched on only briefly here as these alone could take the full discussion time. The following verbatim case report taken from an American Society of Anesthesiologists News Letter[1] will provide a starting point for the discussion.

Several years previously a 63-year-old man had had a gallbladder operation with a stab-wound drainage. For four days prior to admission to the hospital he had been ill with left lower quadrant pain, absence of bowel movement, and intermittent vomiting which had turned fecal at 7 p.m. on the day of admission.

He was admitted with a diagnosis of intestinal obstruction. His temperature was 101.4° F. No other history or physical examination was obtained. The patient was typed and cross-matched, but no other laboratory work was performed. X-ray confirmed the diagnosis.

A Miller-Abbott tube was inserted into the stomach only and the patient brought to the operating room at 1:30 a.m. Preanesthetic medication was morphine grains 1/6 and atropine grains 1/150 at 12:25 a.m. The blood pressure at this time was 140 mm. Hg. systolic and 90 diastolic, pulse 100.1

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*From the Department of Surgery, Southwestern Medical School of the University of Texas, Dallas, and the Department of Anesthesiology, City-County Hospital System, Parkland Hospital, Dallas, Texas.

For the purpose of discussion, let us change the above paragraph to read, "A Miller-Abbott tube was inserted and the bulb was in the second portion of the duodenum. . . ." In the description of the operative procedure that followed, the protocol mentioned "greatly distended bowel." The protocol also said, "The patient was considered to be a poor risk."

This patient is a poor risk as is any patient exhibiting intestinal obstruction with unrelieved distention. Four charts have been prepared to focus attention upon changes in the body physiology resulting from intestinal obstruction and the possible consequences of these changes.

Respiratory Changes.—These changes *(Chart 1)* are the causes and possible end result of diminished tidal volume in these patients. The distended loops of bowel pushing up against the diaphragm limit its motion. The higher diaphragmatic resting level producing basal atelectasis, and the diminished excursions of the diaphragm, reducing tidal volume, combine to effect an inadequate exchange of respiratory gases. If peritonitis is present, the splinting and rigidity of the abdominal wall also diminish the patient's inspiratory effort. The immediate effect of this diminished tidal volume is an inadequate washing out of the body's carbon dioxide resulting in hypercarbia. There is a possibility that early in the picture of distention the tidal exchange would be too small to provide adequate oxygenation of the blood. Certainly with a prolonged period of hypoventilation, a state of hypoxia with hypercarbia, or asphyxia as it is represented in *Chart 1,* would result. The asphyxial outcome of unrelieved abdominal distention is illustrated by the not infrequent patient with intestinal obstruction who is brought to the operating room showing a markedly distended abdomen, dusky to cyanotic skin color, a gasping type of respiration with an ominous tracheal tug, and a semi-comatose or comatose sensorium. Such a patient is exhibiting the signs of carbon dioxide narcosis of the respiratory center plus hypoxia.

Electrolyte Changes.—The only constant electrolyte imbalance found in intestinal obstruction *(Chart 2)* is a decreased volume of salt water. This loss may be overt such as the salt water loss of vomiting or gastrointestinal suction or drainage. In addition to, and regardless of this loss, there is a salt water (and protein) loss into the intestinal wall, the intestinal lumen, and the peritoneal cavity. This insensible pouring out of ions and water must be recognized and rectified according to the clinical signs of salt water deficit.

The concentration of ions in the extracellular fluid will vary according to the ingestion of water during the period of vomiting. If the intake of water exceeds the amount of vomitus, the loss of ions will be greater than the loss of water and there will be a decrease in the concentration of salt water in the body. The usual case is little or no ingestion of water with a resultant increase in the osmolar concentration of the extracellular fluid. The third possibility which is not illustrated in *Chart 2* is that the ingestion of water would just keep pace with the loss of water. In such a case the concentration of the body salt water would remain unchanged. The clinical picture will vary with the concentration of saline ingredients in the blood and act as a guide to the relative amounts of water and salt to give the patient. Regardless of the amount of water ingested and its effect on the osmolar concentration

RESPIRATORY CHANGES

A. Distention leads to
   1. Limited diaphragmatic excursion
   2. Higher diaphragmatic resting level, contributes to basal atelectasis
B. Rigidity (if peritonitis is present) leads to limited inspiratory excursion

} Asphyxia

CHART 1

ELECTROLYTE CHANGES

A. Fluid Loss
   1. Vomiting and gastrointestinal drainage
   2. Internal loss without vomiting (into intestinal wall, intestinal lumen, and peritoneal cavity)

} Decreased volume of salt water

B. Water Intake During Period of Vomiting
   1. If patient drank water—→Decreased concentration of salt water in body
   2. If patient did not drink water—→Increased concentration of salt water in body
C. Site of Obstruction
   1. High obstruction—→Alkalosis
   2. Low and chronic obstruction may have acidosis

CHART 2

of the extracellular fluid, it must be remembered that there is always a decreased volume of salt water. The patient will need fluids containing salt.

The site of obstruction determines to a great extent the ratio of loss of the electrolyte components of the body and the direction of shift of the hydrogen ion concentration. In high obstruction where vomiting plays a big part in the clinical picture, the patient will develop an alkalosis. In low obstructions vomiting usually does not play a major role. The saline ingredients of the extracellular fluid are sequestered into the distended loops of bowel in their normal ratio to each other, and the patient tends to develop an acidosis on a starvation basis.

Hemodynamic Changes.—Chart 3 is a shocking one. Many will disagree with the designation of the entities on the left of the chart as shock, but few would disagree with the premise that the presence of any or all of these conditions predisposes to shock.

As in the respiratory and electrolyte changes, distention is again a major factor. Distention of a viscus, especially rapid distention, can by reflex action produce a marked fall in blood pressure. Abdominal distention, by decreasing the venous return from the legs and by decreasing the negative intrathoracic pressure, may diminish the venous return to the heart resulting in hypotension.

The hypovolemia mentioned earlier may produce a picture of shock. There is a plasma deficit and a salt water deficit. In this type of case, the restoration of the lost salt water seems to be a more important immediate problem than the administration of blood. These patients occasionally develop a hypotension which does not respond to either plasma or blood, but is dramatically remedied by the administration of a saline solution.

There are many opportunities for whole blood loss during the course of intestinal obstruction. Among these are sequestration of red blood cells into the inflamed areas of peritonitis, the massive blood loss into a hemorrhagic infarct, and the diminished blood volume coupled with normal concentrations of hemoglobin and cell mass seen in chronic disease.

All of the factors which are present, whether they progress to the extent indicated on the chart or not, tend to produce a very labile vascular system which is ill-suited to withstand the insult of anesthesia and surgery.

Nutritional Changes.—Chart 4 is presented to emphasize one point. In children ketosis develops in twenty-four hours or less following the cessation of intake. The child must be given sugar early.

One cannot hope to correct the hypoproteinemia before operation. Vitamins can be given in the crystalloid solutions before, during, and after operation. The increasing number of blood banks around the country has nearly eradicated the problem of preparing the anemic patient for surgery.

Now that some of the conditions that may occur in the patient with bowel obstruction have been reviewed, let us move on to the management of the patient in the operating room.

The surgeon should institute correctional therapy for the fluid imbalance before the patient reaches the operating room. If an intravenous infusion is not running when the patient arrives in surgery, one should be started before anesthesia is induced. In the adult, the infusion should be started with no smaller than an eighteen-gauge needle, and every possible precaution should be taken to insure that the needle is secure for the duration of surgery and as long as necessary there-

HEMODYNAMIC CHANGES

A. Distention
   1. Reflex: distention of viscus→shock
   2. Diminished venous return→shock
B. Plasma Deficit, Salt water deficit } Hypovolemic shock
C. Red Blood Cell Loss
   1. Peritonitis
   2. Hemorrhagic infarct
   3. Chronic obstruction

} Shock

CHART 3

NUTRITIONAL CHANGES

A. Acute Obstruction leads to glycogen depletion→ketosis (develops in children 24 hours after cessation of intake)
B. Chronic Obstruction leads to
   1. Hypoproteinemia
   2. Avitaminosis
   3. Anemia

CHART 4

after. The anesthetist will have his hands full once induction of anesthesia is started, and this portal to the vascular system is essential. It provides a means to rectify the salt, sugar, and blood depletions, and to replace blood lost during the operation.

The described patient arrived at the operating room with a Miller-Abbott tube in place with the bulb past the pylorus. The patient should have a Levine tube in the stomach, and that viscus should be empty before induction of anesthesia. With a tube past the pylorus or a nonfunctioning tube in the stomach, fluid can accumulate in the stomach in quantities large enough to drown the patient if it is regurgitated and aspirated. Even with functioning gastric suction, the stomach can contain enough liquid to produce serious consequences if it is aspirated into the tracheobronchial tree. The frequency of regurgitation and aspiration in patients under general anesthesia is great. In a series of patients undergoing elective operations who had had nothing by mouth since the evening before surgery, Culver, *et alii*,[2] found that in the horizontal supine position, 24 per cent regurgitated and 16 per cent aspirated gastric contents sometime during the course of general anesthesia. When a functioning Levine tube was in the stomach prior to induction of anesthesia, this incidence was cut to 12.1 per cent regurgitation and 5.2 per cent aspiration. Obviously, this danger is much increased in the presence of an incompletely decompressed intestine.

As to premedication, no general statement can be made. The premedication would depend to a great extent upon the degree of decompression and debility of the patient. In addition to the usual size and age considerations, such things as the degree of fever present, severity of pain, and, during the hot months, whether the operating rooms are air-conditioned or not would have to be taken into consideration. In any case, one should be very cautious in the use of depressant drugs, and atropine or scopolamine should be given if not specifically contraindicated. In the problem case, the morphine dosage appears to be too large for the patient described.

The patient is "adequately" premedicated, the infusion is running into a vein through a large bore needle, the stomach is empty, and the gastrointestinal drainage is functioning. What is the anesthetic agent and technic of choice in this patient?

LOCAL ANESTHESIA

Local anesthesia may be used and is a good method if one is skilled in that technic. The surgeon usually does all of the local infiltration, but the anesthetist may do the regional block for the abdominal wall with the surgeon injecting the deeper structures as surgery progresses. Surgery under adequate local anesthesia alone is an excellent method. To supplement established general anesthesia with local in order to provide adequate relaxation and block autonomic reflexes in a light plane of anesthesia is likewise excellent. Local anesthesia supplemented by small intravenous doses of morphine or demerol is an extremely dangerous procedure in this type of patient. Further depression of the already depressed respiratory center might well be lethal to this patient. As for "going as far as possible under local" and then giving general anesthesia if necessary, it is a snare and a delusion. Under such conditions, the surgeon usually does not perform an adequate block for a definitive procedure and expects to finish up under general anesthesia. The anesthetist is faced with the problem of anesthetizing a patient who is apprehensive and in pain. The patient, as a rule, requires a much larger amount of anesthetic agent for induction of anesthesia. As an added impediment, the surgical drapes are a constant aggravation to the anesthetist as he endeavors to maintain and insure the airway or to cope with any complication that may arise during the induction of general anesthesia.

SPINAL ANESTHESIA

Spinal anesthesia is contraindicated in the patient with incompletely decompressed intestinal obstruction. In this patient, the spinal would have to be high, to the fourth thoracic segment and would probably be to the second or third. The contraindications will be found in a review of the physiology of intestinal obstruction.

(1) *Respiratory Changes.*—The patient's diaphragm is pushed well up into the thoracic cavity and needs the active assistance of the

thoracic muscles of inspiration, many of which are denervated by a spinal to that level. It is not inconceivable that the spinal could go so high as to leave the inefficient diaphragm as practically the only muscle of inspiration. The patient should be given oxygen and probably should have supplemented respiration. Both, especially the latter, may be technically difficult with the patient under spinal.

(2) *Hemodynamic Changes.* — With high spinal anesthesia the vascular compensations to combat shock, according to the most widely held views, are knocked out. If this patient were hypovolemic or anemic, he would not tolerate high spinal well. Beyond the excellent relaxation produced by the somatic spinal block, the chemical sympathectomy gives ideal intra-abdominal operating conditions by allowing the parasympathetics to contract the intestine except in ileus of long standing in which case a spinal will have no effect. The safety of seeking this parasympathetic effect is questioned by some because of the danger of producing a rupture of the bowel through an ischemia-weakened wall.

GENERAL ANESTHESIA

Pentothal sodium® used alone has no place in anesthesia for operation for intestinal obstruction. It is a respiratory and circulatory depressant, and does not produce relaxation adequate for intra-abdominal surgery. It may be used in combination with other agents. A pentothal® and nitrous oxide anesthetic with relaxation provided by curare is liked by some. Since pentothal® and curare are both respiratory depressant drugs and since it is known that pentothal® is a poor agent to use in a patient in shock or near-shock, this combination of agents does not seem indicated. If this technic of anesthesia is used, an endotracheal tube must be placed to insure patency of the airway, to supplement respiratory efforts, and to provide an avenue for the removal of secretions or aspirated gastric contents from the tracheobronchial tree. Under ordinary conditions with a well-prepared patient whose stomach is empty, endotracheal intubation under pentothal®-curare anesthesia is easy because of the excellent relaxation. In a patient who has an undecompressed intestinal obstruction, the marvelous relaxation from the curare may prove disastrous. The superior esophageal sphincter relaxes and a flood of gastric contents may gush forth, drowning the patient before endotracheal intubation can be performed. This is not a theoretical hazard. That chain of events happens too frequently.

Gas-oxygen-ether or cyclopropane are acceptable general anesthetics for operations for the relief of intestinal obstruction. The anesthesia is best handled using a closed carbon dioxide absorption technic. With this method one can provide the patient with a high oxygen atmosphere and can support respirations to give adequate ventilation and smooth out respiratory efforts.

The anesthetic method of choice in operations for the relief of an incompletely decompressed intestinal obstruction is general endotracheal anesthesia. In such a case, the patient's trachea should be intubated with a cuffed tube under topical anesthesia before the induction of general anesthesia. If necessary, intravenous nembutal® or pentothal® sedation may be given prior to the intubation. Following the intubation, the endotracheal tube should be connected directly with the anesthesia machine and the cuff on the endotracheal tube should be inflated with the minimum amount of air necessary to prevent gas leak around the tube. The cuffed tube is used to provide a barrier between the pharynx and the tracheobronchial tree. After inflation of the cuff, if there are no specific contraindications, one may induce general anesthesia with cyclopropane because of its rapidity. If the patient tolerates the gas well, it may be continued for maintenance. If relaxation proves to be inadequate, ether may be added to the mixture as necessary. Curare could be used for the same purpose. During surgery, blood should be replaced according to the patient's need and the estimated surgical loss. If blood replacement is not necessary, the infusion needle should be kept open with Ringer's solution or 5 per cent dextrose in water according to the indications. Efforts should be made to keep the tubes in the gastrointestinal tract functioning throughout surgery.

At the end of the procedure, if a recovery room is not available the patient should be moved from the operating table directly to his bed for the trip back to the ward. When

this is possible, it obviates the transfer to a cart and then from the cart to the bed with a chance for a profound drop in blood pressure with each transfer.

As a final point, the patient should not be removed from the operating table to his bed or to a cart unless he is in good enough condition to withstand the transfer to the conveyance and the trip to the ward. The surgeon, his assistants, and the anesthetist should be experts in the diagnosis and treatment of vascular collapse. The operating room should have all of the facilities for its treatment. It would be illogical to send a patient who is in a precarious condition back to the ward to add to the load of the floor nurse or to the confusion of the private duty nurse.

SUMMARY

The alterations in the physiologic function of the patient caused by intestinal obstruction with distention have been briefly reviewed. In the anesthetic management of these patients the following safeguards work toward smooth operating conditions and a live patient at the end of the procedure:

(1) The patient should have gastrointestinal drainage. A functioning catheter must be in the stomach and the stomach must be emptied before the induction of anesthesia.

(2) The patient should be prepared for surgery by fluid, sugar, electrolyte, and blood replacement according to his needs.

(3) An intravenous infusion through a large caliber needle should be functioning well before the induction of any type of anesthesia. The infusion should be kept running through surgery and the immediate postoperative period.

(4) Spinal anesthesia is contraindicated in the markedly distended patient.

(5) Pentothal® is contraindicated in these patients except in very small amounts for the purpose of sedation. Its use with curare in these cases is questionable.

(6) Adequate block and infiltration anesthesia is an excellent anesthetic method in this type of patient, as is local supplement of established general anesthesia.

(7) General endotracheal anesthesia with a cuffed tube is the anesthetic method of choice. Cyclopropane and/or ether are the agents of choice.

(8) The patient should not be moved from the operating table until he appears to be emerging well from the immediate effects of the anesthetic and operation.

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MANAGEMENT OF INJURIES OF THE URETHRA AND GENITALIA*

By JACK HYMAN, M.S., M.D.
Mobile, Alabama

One's experience with urethrogenital injuries seems to be proportionate to his proximity to a hospital which receives large numbers of accident cases. It would seem worth while to review some of the more recent concepts in the management of urethral injury incident to non-operative trauma and the infrequently encountered severe genital injury.

Injury in this portion of the anatomy is usually the consequence of extremely forceful trauma. The proximal prostatic and membranous urethra are frequently lacerated by shearing displacement of bone in pelvic fractures. The bulbous urethra is injured by straddle trauma. The pendulous urethra is rarely injured because of the mobility of the penis and the same mechanism protects the penis and scrotum.

Diagnostic procedures which contribute to the evaluation of the site and extent of urethral injury will not be considered. It suffices to relate that this usually is not difficult to determine. More often the urethral injury has been made more extensive by the artless probing of an orderly attempting to catheterize these patients before the urologist is consulted.

Gentle manipulation with a curved coudé catheter has resulted in our reestablishing the continuity of a few incompletely severed urethras. Catheter drainage and antibiotics effected an excellent restoration of the urethra with no apparent early stricture formation. Prior to the era of antibiotics it is probable

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that more extensive drainage would have been necessary and the initial morbidity would have been less tranquil.

Rupture of the prostatic urethra usually occurs at the apex of the prostate. The association of this injury with pelvic fractures presents one with the additional problem of traumatic hemorrhage and shock. Blood and fluid may be required before and during the immediate surgical repair of the urethra. There is no valid argument against attempting an immediate repair unless the patient's general condition prohibits the surgery.

After a suprapubic cystotomy is done, the standard procedure is to align the proximal and distal ends of the urethra and pass a Foley catheter into the bladder. The retention bag is inflated and mild traction applied to the catheter to approximate the severed urethra. There are several methods of accomplishing this end. Our procedure is to introduce the Foley catheter on a guide through the penis and align the posterior urethra suprapubically with one's finger in the prostatic urethra. Suprapubic catheter drainage is maintained for about a week before the urethral catheter is removed. The urethral catheter is left indwelling for about three weeks. This method of management produces reasonably satisfactory results; however, strictures at the site of laceration are almost inevitable. Periodic dilatation is required, but the intervals between sounds can usually be lengthened as time passes.

False passages and clefts in the periprostatic planes can occur and apparently are secondary to manipulation of catheters and sounds prior to or during surgery. These aberrant channels make the passage of sounds difficult or impossible after healing has occurred. *Figure 1* illustrates such a problem.

This patient, J. B., case 1039, a 24-year-old white man, had a complete severance of the posterior urethra by pelvic bone fragments after a crushing injury to the pelvis. Several attempts had been made to catheterize him prior to urologic consultation about 12 hours after his injury. A suprapubic cystotomy was done and the continuity of the urethra reestablished over a Foley catheter. The Foley catheter was removed in 3 weeks and subsequently, although the patient voided satisfactorily, while attempting to dilate the urethra it was found to be impossible to pass a filiform into the bladder. A urethrogram revealed a cavity or recess passing anterior to the prostate with the true posterior urethra angulating into the membranous urethra. The opening of the posterior urethra could not be identified at panendoscopy. The suprapubic sinus was then opened and dilated sufficiently to permit the passage of a No. 21 F Brown Buerger cystoscope. The bladder was cystoscoped from above and a ureteral catheter was passed into the posterior urethra. When the ureteral catheter would not proceed down the remainder of the urethra, the patient was panendoscoped again. Panendoscopy disclosed that the ureteral catheter had passed out the opening of the posterior urethra just at the point of origin of the large anterior cleft and would strike the wall of the cavity. The ureteral catheter was grasped with a cystoscopic biopsy forceps and drawn out the urethra. It was simple to attach a filiform to the ureteral catheter and guide it into the bladder. LeFort sounds were passed and followed by a cloudé catheter which was left indwelling for a week. Subsequently it has been no problem to dilate the urethra periodically and currently a sound is passed every three months.

Since the retropubic approach to the prostate and posterior urethra has been popularized by Millin, several reports have appeared recommending this exposure for primary suture and approximation of lacerations of the prostatic and membranous urethra. As one can appreciate, the exposure is excellent. However, our enthusiasm has been dampened by the tremendous hemorrhage which is present in this area because of the fractures. Manipulation seems to create fresh bleeding

FIG. 1

Cystourethrogram demonstrating angulation of the posterior urethra and false passage.

and it has been necessary for us to abandon the procedure in favor of the easier, more rapid, Foley catheter splint. It is reported that primary suture repair is less likely to produce stricture. It appears that the degree of initial infection and subsequent fibrosis are more culpable factors than the method one employs.

Injury to the bulbous urethra is almost invariably caused by straddle trauma. Frequently, the urethral damage is minimal and initial urethral bleeding is almost ignored as long as the patient can void. On finding a urethral stricture many years later one can obtain the history of injury from the patient. In some instances pressure of the perineal hematoma will so compress the urethra that catheter drainage is required. Hemorrhage from trauma in this area can be quite profuse and it is felt that one should drain the perineal hematoma before it erodes into the urethra.

Severe laceration and severance of the urethra require surgical repair. Here again the trauma is frequently augmented by injudicious catheter manipulation. A suprapubic cystotomy is done for diversion of the urinary stream and retrograde catheterization of the urethra to facilitate identification of the proximal end. The perineum is then exposed and the distal end of the urethra is approximated to the proximal one after trimming the irregular laceration.

In the past, one has always utilized a small caliber urethral catheter as a splint for the anastomosis. Recently the need or desirability of urethral catheters in almost all injuries of the urethra has been the subject of considerable debate. The "non-splinters" insist that the catheter promotes infection and encourages subsequent stricture. We have continued to use a catheter splint believing a small caliber catheter will maintain the patency of the canal while healing occurs without producing additional trauma. The apparent absence of stricture in current reports may warrant one's abandoning the time-honored splint.

Severe injuries of the penis and scrotum are extremely infrequently seen and their repair or reconstruction will tax one's ingenuity. The necessity for conservation of any viable remnants of these organs, no matter how small, need not be overemphasized.

Revolving shafts on power equipment which entangle trousers and avulse the genital skin or portions of the genitalia appear to be the most frequent cause of severe genital injury seen in civilian practice. If the penile skin is avulsed and the scrotum remains intact, one can utilize the elastic skin of the scrotum to cover the denuded penis. The method described by Goodwin and Theelin of burying the penis beneath a bridge of scrotal skin seems to be a very practical one. If the scrotum has been entirely avulsed, split thickness skin grafts can be applied to the penis with equally good result. A relatively hairless area of skin is selected as a donor site. The graft is accomplished as soon as the patient is seen unless there is obvious gross infection. In time the new skin assumes amazing mobility over the penile shaft.

Avulsion of the scrotum leaving the testis intact can be handled initially by placing the testis beneath the skin of the anteromedial aspect of the thigh. A ready space can be made by bluntly lifting the skin from the fascia lata and slipping the testis into this space. If the testes are permitted to remain there the overlying skin becomes slightly redundant and a nice pouch is formed.

Figure 2 illustrates the appearance of such an injury 2½ months later. This 44-year-old man had his trousers entangled in a power shaft and had complete avulsion of the scrotum, right testis, penile, supra-

FIG. 2

Early postoperative appearance of penile transplant.* The remaining testis is in the left thigh.

pubic, and perineal skin to about one centimeter from the anus. The penis was covered by a split thickness skin graft obtained from the thigh. The remaining left testis was placed beneath the skin of the left thigh. The suprapubic area was covered through mobilization of adjacent skin above by means of a transverse relaxing incision. The perineum was reconstructed by mobilizing the nearby skin of the thigh and groin and a primary closure was effected. The cosmetic and functional result has been good. Erections occur without deviation or pain.

Others have reported the construction of a scrotal sac from pedicle grafts obtained from the thigh for the cosmetic effect and with the purpose of preserving spermatogenesis. The only recent report of spermatogenic function is that of Baxter *et alii* whose case still had an azospermia when last examined. A semen specimen has not been studied in the case reported above. Secretion obtained by vigorous massage of the seminal vesicle showed no spermatazoa.

SUMMARY

(1) Severe laceration and severance of the posterior urethra may be managed by either reestablishing the continuity of the urethra over a Foley catheter or suture approximation of the severed ends through a retropubic approach.

(2) The combined suprapubic-perineal approach to primary suture of severe lacerations of the bulbous urethra is the recommended method of management. There are two schools of thought regarding the desirability of using a splinting urethral catheter; the author can offer nothing towards settling the question.

(3) The management of severe genital injuries is briefly presented.

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1302 Government Street

DISCUSSION (*Abstract*)

Major Evan L. Lewis, Washington, D. C.—Rupture of the bladder with separation of the membranous urethra at the triangular ligament requires special care. The bladder and prostatic urethra are carried upward and the intervening space becomes filled with blood and urine. This type of injury often accompanies pelvic fractures. In the early treatment, in addition to cystotomy drainage and closure of the tear, the bladder neck must be pulled downward in place and secured by sutures or traction on a bag catheter. The ideal treatment would be perineal repair; however, in these cases the associated injuries are too severe to permit such surgery, and it is usually necessary to insert a Foley or other bag catheter and by traction draw the bladder neck in place. The traction should be maintained 10 to 14 days.

In late cases, if the urethra has been torn away at the apex of the prostate, permitting the bladder to be displaced upward, and the initial management failed to pull the bladder downward in place during healing, a dense stricture 3 to 5 cm. in length will be found at the bladder neck. This stricture will not respond to dilatation or resection. The operation of choice is free mobilization of the bladder neck by perineal exposure similar to the standard operation for radical or total perineal prostatectomy. The bladder neck is mobilized and sutured to the urethra at the triangular ligament as is done in total prostatectomy. Urethral catheter for splint or drainage should be left in place seven days or longer.

Dr. John F. Patton, St. Louis, Mo.—The subject of trauma is particularly pertinent in the present day, and in discussing Dr. Hyman's paper it might be well briefly to review the essential points in the management of urogenital injuries in general. Five principles are involved, regardless of the level of the urinary tract at which the injury may occur. These are: (1) early recognition; (2) diversion of the urinary stream; (3) drainage in the presence of or for the prevention of extravasation; (4) control of hemorrhage; (5) repair of the defect. These are all familiar to you.

Perhaps the most important single point is early recognition. Injuries of the urinary tract are frequently associated with injury to other organs often of greater urgency and as a result they may be overlooked. The responsibility for detection will often rest with the general surgeon or the house officer in civil life as they are usually the first to see these emergencies. In war it is the forward surgeon. Thus an awareness on their part is essential. Early recognition permits early repair which in turn helps to prevent the untoward effects of intervening infection, lessens scar tissue formation, reduces postoperative morbidity and materially shortens the period of disability. Early repair may not be practical in all instances but should be performed whenever possible.

Injuries to the kidney in general should be managed conservatively, but demand close observation. It is easy to err on the side of conservatism, however, an exploratory operation is the best course if one is in doubt. Injury to the ureter demands early diagnosis to prevent extravasation of urine as well as to offer an opportunity to preserve the kidney. Initial repair is preferable in all cases. Injury to the bladder and urethra should be suspected in all penetrating wounds of the lower abdomen, buttocks, perineum, rectum and thighs, and in all pelvic injuries. Rupture of the bladder into the peritoneum demands immediate suture. Other bladder wounds should be repaired

initially if possible. All wounds of the bladder and severe wounds of the urethra require diversion of urine by cystostomy and drainage for extravasation.

In wounds of the external genitalia one should make every effort to conserve tissue. Every bit of viable skin should be preserved. As with other soft tissue wounds, it is seldom necessary to trim skin edges. Also, the skin of the penis and scrotum regenerates exceptionally well, and large areas of denuded skin alone is neither sufficient reason for emasculinization or cause for precipitious skin grafting.

In regard to the use or non-use of splints in the repair of the urethra or ureter, I would like to make one point. In the event of a major civilian catastrophe with mass casualties, we must remember that much of the initial surgery will of necessity be performed by surgeons of varied talents, not urologists, and it would not seem wise to advocate or teach non-use of a splint under these conditions. I am quite sure that under such circumstances we would see less trouble if a splinting catheter were employed.

INTRAMEDULLARY FIXATION OF FRACTURES OF THE FOREARM*

By R. H. HALL, M.D.
Fayetteville, North Carolina
E. I. BUGG, M.D.
Durham, North Carolina
and
R. E. VITOLO, M.D.
Fayetteville, North Carolina

HISTORY

Intramedullary fixation for shaft fractures of the radius and ulna has not advanced with such rapid strides as has similar fixation for femoral fractures. L. V. and H. L. Rush, in 1937,[1] published the first paper in this country on the use of Steinmann pins for intramedullary fixation of ulnar fractures. Lambrinudi,[2] in 1940, reported using Kirschner wires in the forearm, as did Dickson[3] in 1944. Soeur,[4] in 1946, reports using Kirschner wires, solid rods, V- and U-shaped pins. L. and J. Bohler[5] reported, in 1949, that they no longer used the Kuntscher nailing technic for forearm fractures. Smith,[6] in Campbell's "Operative Orthopedics," describes intramedullary pinning of the ulna with a Steinmann pin or Kuntscher U-nail and the radius with a single Kirschner wire, guide pin, or Kuntscher U-nail.

Although our experience dates only from January 1950, we feel that we have developed such a satisfactory technic that it is, for many fractures of the forearm, the conservative method of treatment. We have used intramedullary fixation for forearm fractures in 20 cases with satisfactory results.

TECHNIC

SMO stainless steel pins of adequate length and ordinarily of 3/32 or one-eighth caliber are used. These are cut obliquely at 45 degrees on one end and threaded for about three-fourths of an inch on the other end. Metal rod adaptors, one-fourth inch diameter, drilled out on one end and threaded, for removal of the pins either during the operation or after the bone is healed, are used. However, these special pins and adaptors, while of help, are not essential.

Ulnar fractures are reduced after exposure of the fracture site by subperiosteal dissection through the subcutaneous approach. Through a one-inch incision over the olecranon a bone awl is inserted to make passage for the Steinmann pin. A single one-eighth inch diameter pin is usually employed, but this can be modified when necessary for adequate fixation.

For radial fractures the site is exposed through a dorso-lateral approach just dorsal to the brachio-radialis tendon and muscle. The lateral antebrachial cutaneous nerve is almost always found just beneath this incision and should be preserved. It parallels the incision and can easily be retracted to one side or the other. The radius can be exposed through this incision by following muscle planes, except in the upper third where it is sometimes necessary to cut across or retract a few fibers of the supinator. The fracture is reduced and held with bone clamps. Through a one-inch incision, just proximal to the snuff box, a U-shaped flap of periosteum and bone is then elevated from the radial styloid process. Through this opening cancellous bone may be removed to be placed about the fracture site. When a greater amount of bone is needed, iliac cancellous bone can be used. A 3/32 inch diameter pin is angulated about 30 degrees, 1 to 2 cm. above the tip. The pin is

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then inserted into the styloid opening as parallel to the shaft as possible and pushed (not drilled) across the fracture site. The fracture site must be observed carefully to be sure that the pin penetrates the medullary cavity of the proximal fragment and not the soft tissues. At this stage the portion of the pin remaining externally is bent outward away from the radius about 15 degrees in order that it may conform more closely to the contour of the radius. The insertion of the pin is then completed and the threaded portion may be bent outward about 30 degrees with the adaptor to facilitate withdrawal at a later date. A nail set may be used to complete the insertion. This pin is then followed by two, three, or four others until the radius is stable enough to resist bending and rotation. Large butterfly fragments are fixed anatomically with an oblique screw or a suture, while small ones are merely placed in position. An effort is made not to disturb their soft tissue attachments. Segmental fragments are threaded over the pins in anatomical position, their soft tissues being disturbed as little as possible. Incisions are closed anatomically in layers. When nonunion with shortening of one bone is present, the other must be shortened to obtain good approximation of the ununited fragments. This osteotomy is stabilized by the method described, as is osteotomy for malunion.

Postoperative Care.—A bulky sterile pressure dressing is applied to just above the elbow. When the fracture site is stable at surgery, no plaster fixation or splints of any kind are used. Early in our series we used casts in two cases because of the severity of the injuries. The forearm is suspended for several days postoperatively for the comfort of the patient and to prevent swelling. Usually, by the second or third day elevation on pillows is adequate. The pressure dressing is loosened or changed completely when indicated. After the first three days the patient is ambulatory for short intervals with a sling, but takes the arm out as described for active exercise within the limits of pain. The patient is usually discharged a few days after operation; he is directed to resume activity within the limits of pain. If delayed or nonunion is present prior to intramedullary fixation, there is usually considerable stiffness of the wrist, fingers, and elbow, both before and after surgery. Two weeks postoperatively, progressive resistive exercises are started.

COMPLICATIONS AND RESULTS

Most of the complications so far have been technical. Frequently the point of a pin becomes impinged against the cortex of the radius; this can be overcome by a slight rotation of the pin or by removing the pin and adjusting its curve slightly. If care is not used, the pins can penetrate the soft tissues of the forearm either by piercing the bone cortex or emerging through the fracture site.

So far we have had no nonunions and no infections. After fresh fractures patients have resumed their regular work as early as two weeks postoperatively. Considerable callous formation has been present at as early as four weeks after operation.

DISCUSSION

Intramedullary fixation is suitable for displaced diaphyseal fractures of either or both bones of the forearm in adults, whether the fracture is single or segmental, simple or compound. This fixation is contraindicated in children. Severely comminuted fractures usually cannot be held satisfactorily with intramedullary fixation. Fractures of the proximal or distal fourths of the radius have not been treated by the authors by this method. Our technic, together with cancellous bone grafts as described, has proved very satisfactory for delayed union and nonunion. We believe that lack of experience with intramedullary fixation should be strong contraindication for this type of surgery.

Anatomical or nearly anatomical positioning and alignment of the fragments can be obtained. The adjacent joints do not need to be immobilized. Functioning of the muscles creates a compression force on the fracture sites which is perfect for impaction and conducive to healing. Disability during convalescence is greatly decreased. The complications of closed reductions, plaster casts, and large economic losses are avoided. Nursing care is shortening and simplified. The instruments used are neither complicated nor expensive.

Intramedullary pinning of the bones of the forearm is major surgery and should not be

FIG. 1A

Malunion of radius and nonunion of ulna first seen January 15, 1951, five months after original fracture, August 8, 1950.

FIG. 2A

Malunion of ulna and nonunion of radius first seen June 12, 1950, six months after original fracture, December 19, 1949.

FIG. 1B

Three months after osteotomy of radius, intramedullary fixation, and bone graft, full elbow and wrist motion are present with 25 degree loss of pronation and supination.

FIG. 2B

Three months after osteotomy of ulna, intramedullary fixation and bone graft, full elbow and wrist motion are present with 20 degree loss of pronation and supination.

undertaken lightly. The theoretical disadvantages of infection, sequestration, fat embolism, or involucrum formation, have not been encountered as complicating factors in this series of cases.

SUMMARY

We have presented a technic for intramedullary fixation of shaft fractures in the forearm, which in our hands has been very satisfactory. The fractures have united in all

FIG. 3A

Simple recent fracture of both bones of the right forearm, March 6, 1950.

FIG. 4A

Simple recent fracture of both bones, segmental radius, right forearm, November 12, 1950.

FIG. 3B

Three months after intramedullary fixation, full function is present.

FIG. 4B

Four months after intramedullary fixation, full function is present.

of our 20 cases, including simple, segmental, comminuted, malunited, and ununited fractures. Complications have been minimal and rapid restoration of function has been gratifying. No special instruments are required.

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DISCUSSION *(Abstract)*

Dr. Robert A. Knight, Memphis, Tenn.—In 1949, Dr. George Purvis and I made an end-result study of fractures of both bones of the forearm, treated by the staff of Campbell Clinic; 100 cases were followed in complete detail. The results obtained from intramedullary fixation were not encouraging. The poor results were due to (1) failure to maintain correct rotational alignment of the radius (a very important feature), (2) angulation in cases where a single intramedullary wire was used in a double fracture of the radius, (3) angulation at the fracture site due to too early removal of internal and external fixation, and (4) nonunion. At that time, it was suggested that "the employment of two or more Kirschner wires, as utilized by Lambrinudi, may prove more satisfactory for maintaining radial fractures than a single wire." Apparently the authors have had no difficulty in maintaining the interosseous space, a factor of major importance if the normal range of rotation is to be maintained.

I can see no valid reason why plaster fixation should not be used for at least the first four weeks after operation. This would allow better soft tissue healing, would help prevent rotational and angular stresses at fracture site until union is at least under way, and yet would allow sufficiently early function to prevent excessive atrophy and stiffness.

Several of the authors' recommendations should be remembered when using this method. This form of treatment, with few exceptions, is contraindicated in children. Intramedullary fixation does not satisfactorily maintain reduction and fixation in severely comminuted fractures. This method is not applicable to fractures of the proximal and distal fourths of the radius. Last, but not least, lack of experience with intramedullary fixation should be a strong contraindication to its use.

Dr. F. Walter Carruthers, Little Rock, Ark.—The paper presented by the essayist pertains to fractures in the long bones which have been generally neglected in the literature because of the great emphasis placed on intramedullary treatment of fractures of the femur and to a less extent, the humerus.

Certainly it has been our experience that several methods of intramedullary nailing of the forearm bones can be tried and we have used them. The method described has been used and has certain advantages, the most pertinent being ease of insertion. We have found in our experience, however, that our results with Rush nails have been very satisfactory. We have been a little more conservative in postoperative immobilization and feel the authors have allayed some of the fears which we have had. It is encouraging to note that the authors stress use of the wires in the diaphysis only. If this rule were adhered to, fewer poor results would be obtained.

Dr. Dana M. Street, Memphis, Tenn.—From the standpoint of union, Dr. Hall's series of twenty cases with union in every case is better than others have reported for this method of treatment in the forearm. You will recall that Böhler largely abandoned it in the forearm. Haebler considered it satisfactory but used a cast for four weeks postoperatively. Our own forearm cases have not done so well in regard to bone healing as our femur cases. We have had no nonunions in over one hundred fractures of the femur treated by nailing. However, nonunion occurred about twenty times following the insertion of one hundred nails in the forearm.

In some of our nonunions, the fixation was not so stable as in Dr. Hall's cases. In our early ones we used Kirschner wires which were not sufficiently rigid. Later we used U-shaped Kuntscher nails, a number of which broke. Still more recently we have used Rush nails which are comparable to those used by Dr. Hall, but we have had some cases of nonunion even with these.

While we feel a cast is to some extent disadvantageous, we have had some nonunion where none was employed and now use a cast for four weeks postoperatively.

Dr. Hall has mentioned no cases in which the ulnar nail has migrated backward from the olecranon. We have had several which have done so, but none has migrated when inserted through the ulnar styloid.

We have not found so large an incision as one inch to be necessary at the radial styloid, but have inserted the nails through a one-fourth inch incision.

SURGICAL UNIFICATION OF DOUBLE UTERUS*

TECHNIC, INDICATIONS AND RESULTS

By ERWIN O. STRASSMANN, M.D.
Houston, Texas

Any uterus with two separate cavities may be termed a double uterus. Two main groups can be distinguished:

(1) The externally unified uterus with two chambers formed by a septum.

The degrees are: uterus subseptus and uterus septus.

(2) The externally divided uterus with two cavities formed by two separated muscular bodies or semi-uteri. In this group the degrees are: uterus arcuatus, uterus bicornis unicollis and uterus bicornis bicollis (didelphys).

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*From the Department of Gynecology, Baylor University College of Medicine, Houston, Texas.

A double vagina is frequently present in the latter group.

This simple classification of symmetrical duplicities, as suggested by P. Strassmann,[1] is satisfactory for all practical purposes. A more elaborate classification can be found in the literature. The asymmetrical type of uterine malformation concerns mostly the development of rudimentary horns. These cases are not recommended for surgical unification and therefore are omitted in this essay.

The etiology of the various forms of double uterus is based upon incomplete or totally missing fusion of the mullerian ducts. In many mammals double uteri are the norm. They are physiologically necessary to accommodate numerous fetuses. In the three highest developed primates and homo sapiens the double uterus is unphysiologic and often accompanied by other abnormalities especially those of the urinary tract.

Independent of the degree of duplicity the same type of clinical pathology is encountered in many patients. These are briefly:

(1) Dysmenorrhea and polymenorrhea.
(2) Dyspareunia and sterility.
(3) Habitual abortions, dystocia, malpresentations, and postpartum hemorrhages.
(4) Hematometra, hematosalpinx, endometriosis and subsequent pelvic inflammatory disease.

I like to point out that not all women with double uterus have disturbances of the above kind. Some of them may have perfectly normal menstrual functions, normal pregnancies and deliveries, according to various statistics 25 to 40 per cent. They may even go through life without their abnormalities ever being detected. These patients, however, are the exception rather than the rule. Thanks to the modern method of hysterosalpingography many more instances of double uteri are found than previously, especially if this test is taken routinely, when nothing else can be blamed for the dysfunction.

It is quite natural that the surgical age created the desire to restore normal function in these instances by surgical means.

The first step in this direction was the simple removal of the uterine septum done by Ruge and Schroeder[2] in 1882. The patient who had a uterus septus had lost two pregnancies by spontaneous abortion. Within a year after excision of the septum she carried to term and delivered a baby of 3,000 grams without any difficulty.

The removal of the uterine septum was repeated by others but it was obvious that this operation was sufficient only in the externally unified uterus septus, not in the externally divided uterus with two separate corpora.

The idea of plastic unification of a double uterus connecting the two bodies into one was conceived by my father, Paul Strassmann, and executed by him in 1907.[1] He realized that the united normal single uterus provides twice the breeding space that the ununited half uteri have.

You may be interested to know a few details about his first case which led to the new operation.

A 27-year-old woman with dyspareunia and dysmenorrhea had experienced 8 pregnancies which all terminated prematurely or as miscarriages. She had undergone 5 curettements. Only one premature baby could be kept alive with considerable effort. She had a uterus bicornis unicollis. The plastic unification was done through the vaginal route which in those days was safer than a laparotomy. Through an anterior colpotomy both uterine bodies were brought out in front of the vulva and the adnexa were inspected. Now an incision was made across the saddle running transversely from the right cornu to the left. Both uterine cavities were opened and the bridge between them was severed until the common cervical canal was reached. The two opened semi-uteri were adapted to each other by converting the transverse incision into a longitudinal anterior-posterior line. The lateral angles of the actual incision became the center of the suture line and the top of the new fundus. The uterine halves were joined together into one normal pear-shaped single uterus by two layers of interrupted catgut. The first layer was stitched through the entire wall on both sides, the second layer superficially through the serosa.

The new uterus was placed back into the pelvis and the anterior uterine wall was attached to the bladder peritoneum for anterior fixation and peritonization.

The postoperative course was uneventful. A year and a half after the operation the patient had her first full term baby. She had five more living children thereafter, altogether six following the operation, all delivered, by the way, *per vaginam*.

After this encouraging result this operation which carries my father's name was performed more and more by him and others. It became a standard operation in European countries, but remained rather unknown on this side of the Atlantic apparently because most papers concerning it were published in German,

Italian, French, or other European medical journals.

My father performed his operation for double uterus in the course of the years on seventeen women. Since I have been practicing in this country I have done 5 cases, which gives us 22 in the family. Ninety more cases had been reported by 47 other operators up to 1949 (Mitteldorf[3]). Two more cases were done by Felix Rutledge[9] from Houston, Texas, recently and presented to the Texas Association of Obstetricians and Gynecologists (not yet published). The grand total of 114 operations appears a large enough number to permit an opinion on the merits of this procedure. Of course, through the years many more unification operations have been performed which have not been published. For instance, Stoeckel[3] mentioned in 1928 in the Berlin Society of Obstetrics and Gynecology that he had done the operation several times. In the same Society on July 7, 1932 G. A. Wagner presented a woman who had delivered seven babies spontaneously after he had performed the operation. This was recorded by Louros[5] in a paper on "The Strassmann Operation for Uterus Duplex and Bicornis." Also H. H. Schmid did 5 cases not included in Mitteldorf's statistics. But these cannot be taken into consideration in this report, because we do not know the details.

While my father did eight of his 17 cases through the vaginal route, most of his followers including myself preferred the simpler approach through the abdomen. The technic of unification is the same. Good illustrations are found in the English translation of the "Textbook on Gynecologic Operations" by Heinrich Martius.[4]

In cases of double vagina and double cervix the laparotomy is preceded by severing the septum of these organs and packing cervix and vagina up to the bifurcation of the uterine bodies. In his paper "Childbirth Following Strassmann Operation" E. F. Mitteldorf[3] in 1949 compiled a list of the 107 known case reports published so far with all available details. To these I like to add the report of my own five cases.

Case 1.—Mrs. W. S. W. was 23 years old when I saw her in 1945. Two years before, in 1943, she had lost two pregnancies by spontaneous abortion at 2½ months each. In 1944 a physician suspecting a tumor performed a laparotomy. Fortunately he realized that he was dealing with a double uterus. He left it untouched and just removed the appendix. Menstruation occurred every two weeks with considerable flooding spells. Finally the patient bled three weeks without interruption.

A hysterosalpingogram revealed patent tubes and a uterus bicornis unicollis. The two uterine corpora formed an angle of 145.° The indications for the operation were habitual abortions and menometrorrhagia. On September 9, 1945 the plastic unification of the double uterus was done by laparotomy.

The new normal shaped uterus was ventrosuspended. The postoperative course was smooth and the patient returned to her home town. There on December 22, 1947 her physician delivered a living boy of 5 pounds and 10 ounces by elective cesarean section. The baby was in breech presentation.

Not quite two years later, the same physician delivered another boy (6 pounds and 11 ounces) again by cesarean section. Since it was the fourth laparotomy of this patient she was sterilized at this time.

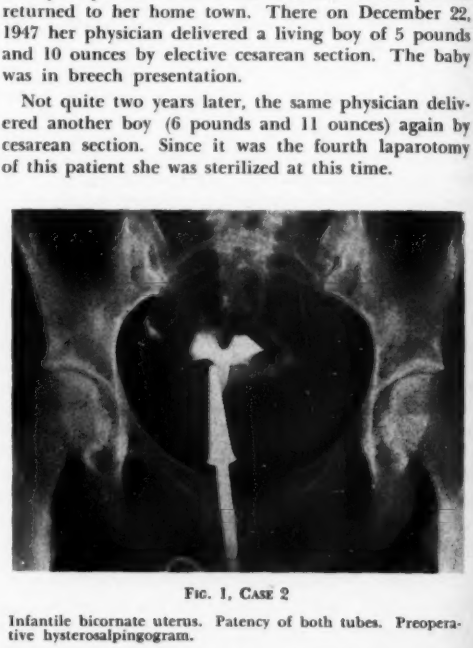

FIG. 1, CASE 2

Infantile bicornate uterus. Patency of both tubes. Preoperative hysterosalpingogram.

FIG. 2, CASE 2

Postoperative hysterosalpingogram reveals single cavity. Tubes still patent. Living baby in breech presentation delivered by cesarean section within a year after unification.

Case 2.—Mrs. J. B. F., 24 years old, married 4½ years, sought my advice for sterility in 1949. She reported that in 1944, five years before the consultation, a laparotomy had been done and a cyst removed from the right ovary and also the appendix. Her menstrual history was essentially normal, the husband's sperm satisfactory. An endometrial biopsy indicated ovulation. Hysterosalpingogram revealed a bicornate infantile uterus of the arcuate variety and patency of both tubes *(Fig. 1)*. Since no other factor was found as cause for sterility, a plastic unification was done through the old laparotomy scar on March 17, 1949. The postoperative course was uneventful. The patient became pregnant before her six weeks checkup, against our instructions. The pregnancy proceeded undisturbed. The baby was in breech presentation. For this reason I preferred cesarean section delivery, which was done on January 25, 1950. A normal baby girl of 6 pounds, 12 ounces was obtained. Postoperative course was uneventful.

A hysterogram done in December, 1950, shows a small single uterine cavity and patency of both tubes *(Fig. 2)*.

Case 3.—Mrs. L. P., 25 years old, had been married for 12 years without ever being pregnant. She sought advice for sterility in 1949. The menstrual history was essentially negative. In 1940, she had undergone laparotomy for pelvic abscess and appendectomy. A double uterus was found at that time. Hysterosalpingogram revealed a uterus bicornis with tubes closed apparently at the fimbriated end *(Fig. 3)*. There was no double vagina.

An intravenous urogram revealed complete absence of the left kidney which was verified by retrograde urography and color secretion test.

On December 10, 1949, the operation was commenced vaginally by dissecting the partition between the two cervices. The abdomen was then opened by excising the old scar. It was found that what we had interpreted as tubes were actually the two uterine bodies forming a straight line (an angle of 180°) and that the tubes were blocked at the isthmus. They could be probed up to the utero-salpingeal junction after severing adhesions around the fimbriated ends.

FIG. 3, CASE 3
Uterus bicornis bicollis. No patency of either tube.

The plastic unification of the two semi-uteri was done after removal of a strong vesicorectal ligament. In spite of the wide angle between the two uterine bodies there was no tension in the lateral ligaments following the operation. The postoperative course was uneventful. A hysterogram done eight months after the operation *(Fig. 4)* shows the new single uterine cavity but no patency of the tubes.

The patient has not become pregnant so far and is not very likely to do so. Her sterility was not caused directly by the double uterus, but by an obstructing isthmic salpingitis.

Case 4.—Mrs. W. N. Sp., 26 years old, came to the office in 1950 on account of sterility and severe dysmenorrhea. She had been married 6½ years. She had seen three physicians previously. Her double uterus had not been detected. Rubin test revealed tubal patency. The husband's sperm had been satisfactory. The patient had been treated with hormone injections, thyroid tablets, vitamin E and iron. A hysterosalpingogram which we took on March 14, 1950 revealed a uterus bicornis unicollis and patency of the tubes.

FIG. 4, CASE 3
Following unification of cervices and uteri still no patency of tubes. No subsequent pregnancy.

FIG. 5, CASE 4
Uterus bicornis unicollis. Patency of both tubes. Uterine cavities form an angle of 180.°

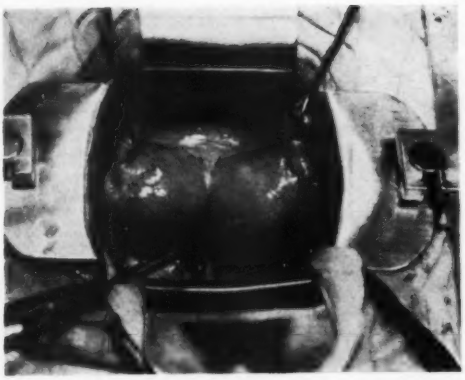

FIG. 6, CASE 4

Double uterus exposed by laparotomy.

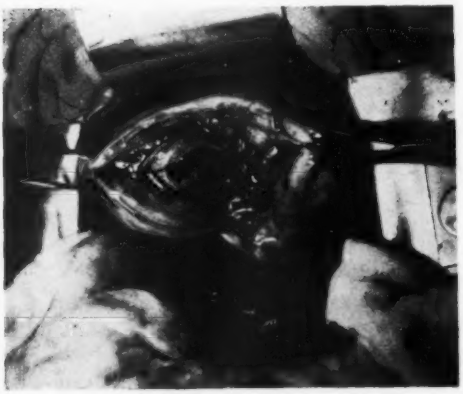

FIG. 7, CASE 4

Operation, step 1. Both uterine cavities opened by transverse incision.

FIG. 8, CASE 4

Operation, step 2. Beginning unification of semi-uteri by sagittal suture line.

The semi-uteri presented a straight line forming an angle of 180° *(Fig. 5)*. Indications for surgery were severe dysmenorrhea and sterility. On April 11, 1950, a laparotomy was done through a Pfannenstiel incision. The double uterus was exhibited *(Fig. 6)* and a cyst the size of a walnut containing old blood (endometriosis) was removed from the right ovary. There were other small areas of endometriosis in the cul-de-sac. The two uterine bodies were incised along the median ridges and the cavities opened all the way down into the common cervix *(Fig. 7)*.

The semi-uteri were then joined together by converting the original transverse incision into a suture line running sagitally *(Fig. 8)*. At the end of the plastic operation the uterus had the shape of a perfectly normal single organ *(Fig. 9)*. There was no tension of the lateral ligaments. The uterus was ventrosuspended and the appendix was removed. Postoperative recovery was uneventful.

The patient has not become pregnant so far, but her dysmenorrhea is greatly relieved. The chances of pregnancy may be somewhat reduced by endometriosis. A postoperative hysterogram was not taken because of the patient's allergy toward the opaque medium.

Case 5.—Mrs. A. E. K., 32 years old and married eight years, came to the office on account of sterility in 1948. Her menstrual history was essentially normal. Tubal insufflation indicated patency. Endometrial biopsy revealed ovulation. The husband's sperm was satisfactory in quantity and quality. Hysterosalpingogram *(Fig. 10)* taken on April 11, 1949 showed the so far unknown fact that the patient had a uterus bicornis unicollis which was tipped to the right. The semi-uteri formed an angle of about 110.° Patency of both tubes was verified. Within a month after the test the patient became pregnant for the first time, but she miscarried spontaneously at three months on August 4, 1949. She became pregnant again in November, 1949, but miscarried a second time after two months on January 24, 1950.

Nine years of sterility and two spontaneous abortions following tests and treatments presented a suffi-

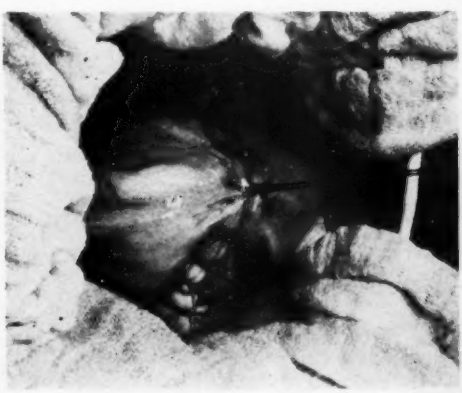

FIG. 9, CASE 4

Operation, step 3. Completed unification of double uterus into a single normal organ.

FIG. 10, CASE 5

Uterus bicornis unicollis with patency of tubes. Habitual abortions preoperatively; vaginal delivery of living infant after unification operation.

cient indication for plastic unification of the double uterus on this now 35-year-old patient. For reason of better healing conditions we waited for six months after the miscarriage with the operation. This was done on July 29, 1950, through a Pfannenstiel incision. The postoperative course was uneventful. After the recommended waiting period of another six months the patient became pregnant; her last menstruation began on February 19, 1951. Her pregnancy has been undisturbed so far in spite of a lengthy voyage to Europe. The expected term of delivery is November 26, 1951. The type of delivery will depend upon conditions at that time.*

Summarizing my own five cases of plastic unification of double uterus, three were done for sterility, two for habitual abortions. Dysmenorrhea and metromenorrhagia were additional indications in two cases. Four full term pregnancies have occurred in three patients after the operation. Three living babies have been delivered by cesarean section, two of them in breech presentation. The fourth pregnancy is close to term and a living baby can be anticipated. In two patients pregnancies have not yet occurred. In one of these the chances are practically nil because of isthmic salpingitis, in the other reduced because of endometriosis.

INDICATIONS AND CONTRAINDICATIONS

The presence of a double uterus *per se* is not an indication for plastic unification. This has been stressed by the originator of the metroplastic as much as by most of the operators who published their experience with this method.

The main indication is to help those women to become mothers who are prevented to do so on account of their malformation. To this group belong patients with habitual abortions and those with sterility. It is the opinion of some that patients with double uterus have no higher percentage of sterility than those with a normal single uterus. That may be primarily true. But it is a fact that in many cases of double uterus hematometra and hematosalpinx develop with subsequent salpingitis and pelvic inflammation or endometriosis leading to sterility.

Philipp[6] in a recent report on 50 cases of duplex uterus found 21 of them afflicted with salpingitis. Nine of these women were secondarily sterile as a result of tubal inflammation. In order to prevent secondary sterility Philipp recommends not to wait too long with plastic unification, which he performed in eight of his cases.

The second indication for this operation is severe menstrual disorders. To this group belong patients with severe dysmenorrhea and patients with menometrorrhagia who do not respond to conservative treatment.

Hysterectomy or removal of one semi-uterus are unnecessary and mutilating operations, especially in younger women. Only the removal of a rudimentary horn may be justifiable in cases of hematometra or pregnancy with potential rupture. In patients with symmetrical malformation the unification restores the form and with it the function.

In the above-mentioned reported 114 cases of this operation the indications are known in 81 instances. In some of these more than one indication existed. The actual figures are:

Indication	No.	Per Cent
Habitual abortion	34	42
Dysmenorrhea	33	40.5
Menometrorrhagia	22	27
Sterility	12	15
Dyspareunia	9	11
Premature deliveries	3	4

It may be pointed out here that dyspareunia is usually the result of a vaginal septum rather than of a double uterus; it is therefore by itself no indication for metroplastic surgery.

The medical literature is full of reports concerning the clinical pathology and dys-

*This patient went spontaneously into labor on December 9, 1951. She had a healthy living girl of 7 pounds, 15¼ ounces in right occipitoposterior position, delivered by forceps rotation and extraction the same day.

functions connected with ununited mullerian ducts. Every case has to be studied upon its own merits. It has to be kept in mind that the unification operation is a constructive procedure which provides a physiologic union that nature forgot to complete. Three rules have to be adhered to before a unification may be prescribed.

(1) A hysterosalpingogram should be done to determine the exact size and position of the semi-uteri and those of the cervices in cases of uterus didelphys. The patency of at least one tube should be assured. If bilateral tubal obstruction is encountered, unification for sterility is a useless procedure.

(2) An intravenous urogram and in doubtful or abnormal cases retrograde urography and color excretion tests are absolute musts. The frequency of urologic malformations in combination with duplex uterus has been mentioned above. I observed the absence of one kidney twice, once in a patient prior to the operation, the other time in a patient with a uterus didelphys who had had one semi-uterus amputated by somebody else before I saw her.

(3) No unification should be undertaken at the time of an abortion and miscarriage or shortly thereafter. One should wait at least six months in order to safeguard good healing and to obtain satisfactory scars.

POSTOPERATIVE OBSERVATIONS AND RESULTS

(1) In 114 cases of plastic unification known and published since 1907 there has been only one postoperative death. This occurred in the early days when a pyosalpinx was encountered. This ruptured at operation, causing general peritonitis.

(2) In 69 pregnancies following the operation there was no maternal death.

(3) There was no case of uterine rupture during pregnancy or delivery. This is remarkable considering the fact that only 6 of 59 full term pregnancies were terminated by cesarean section; the remaining 53 babies were delivered *per vaginam*.

It is the concensus of all operators that the uterine scar following unification can be fully trusted in contrast to those following cesarean sections. The simple explanation is that scar formation in the puerperal uterus takes place under entirely different biologic conditions.

(4) Fifty-eight babies out of 59 full term deliveries following the operation were born alive. One infant died *in utero* prior to delivery in a case of placenta previa.

FUNCTIONAL RESULTS

Menstrual disorders in patients with any form of double uterus seem to clear up in a high percentage of cases after metroplasty. This holds true for cases with severe dysmenorrhea as well as those with menometrorrhagia. In none of the reported cases did we find a note that any of these conditions persisted afterwards. In 34 instances complete relief was recorded. In one of my cases where dysmenorrhea existed prior to the operation complete relief was obtained. In two patients with menometrorrhagia this condition subsided postoperatively.

The main indication for surgical unification of double uterus, however, as I see it, is the impossibility for women to have living children. Here we find women with habitual abortions and those with sterility in whom all other factors as possible causes have been eliminated.

The individual case reports above already indicate what the provision of a single normal breeding space can accomplish. Six living children followed the very first plastic unification my father performed in 1907. Three living babies were delivered in two of my patients; a fourth one in a third patient is due this month.

In order to put on a percentage basis what we may expect from the operation we have to compare in actual figures the outcome of pregnancies in unoperated cases with those following the operation.

Ernst Philipp[6] whose reports of 50 cases of duplex uterus were mentioned above, recorded 64 pregnancies in 26 patients who were not operated upon.

Sixteen or 25 per cent of these pregnancies came to term, four with breech presentation and two with transverse presentation.

Ten or 16 per cent were premature deliveries.

Thirty-eight or 59 per cent were abortions or miscarriages.

These figures are fairly representative for all statistical reports of this kind.

In 114 patients, who later underwent plastic unification, the figures are even more outspoken because these patients were selected for surgery by the various surgeons on account of their disabilities. There were 104 preoperative pregnancies reported in these patients.

Four or 3.8 per cent of these pregnancies went to term.

Seventeen or 16 per cent ended prematurely.

Seventy-one or 68 per cent were miscarriages.

In 12 or 11.6 per cent the outcome was unknown or not reported.

So far as pregnancies are concerned which are recorded postoperatively one has to keep in mind that this figure is bound to be incomplete, since many operators reported their cases soon after operation or did not follow them up long enough to report the full number of pregnancies which may have occurred in the course of the following years. Yet, the number and the quality of known postoperative pregnancies is sufficient to evaluate the benefit of the procedure.

A total of 72 pregnancies have been reported (including my own).

Fifty-nine or 82 per cent of these were full term deliveries.

Ten or 14 per cent were miscarriages.

Three or 4 per cent were undelivered at the time of report or their outcome is unknown.

There was no case of prematurity reported.

If we compare these figures with the ones before the operation in these women, we find that the percentage of full term babies rose from 4 to 82 per cent, while miscarriages dropped from 68 to 14 per cent. Even if we add the pregnancies with unknown outcome to the full term group on both sides they would rise from 15 per cent preoperatively to 86 per cent postoperatively.

If we compare the postoperative figures with Philipp's unselected cases of unoperated duplex uterus we find that the percentage of full term pregnancies was 25 in unoperated cases of double uterus and 82 in the postoperative group; while the percentage of miscarriages is 59 in the unoperated cases and only 14 in the operated cases.

Summarizing we may state that with proper indications the plastic unification of double uterus, by providing a breeding space twice the size that was present before, quadruples the chance of carrying a pregnancy to term while it reduces the chance of miscarriage to about one-fourth.

So far as sterility is concerned we are hesitant to evaluate the chances of improvement on a percentage basis. The reason for this is that many of the reported cases were done in the early decades before the Rubin test and hysterosalpingography were used. We therefore cannot tell whether sterility was caused by the double uterus or by tubal obstruction and pelvic inflammation. In our own experience sterility can be relieved by metroplasty, when no other cause is found besides the double uterus.

Plastic unification of double uterus has been accepted in European gynecology for many years. It is described and illustrated in the textbooks of Victor Bonney,[7] England, Josef Halban,[8] Vienna, Heinrich Martius,[4] Germany, and others. It deserves a place in the textbooks as well as in the gynecologic practice of this country.

SUMMARY

(1) A double uterus occurs in two main forms. If two cavities are created by a septum (uterus septus), simple removal of the septum restores a single cavity. If two cavities are created by two separate muscular bodies (uterus bicornis or uterus bicornis bicollis) plastic unification is necessary to provide a single uterus with normal breeding space.

(2) The operation for this condition was conceived and performed for the first time by Paul Strassmann, the father of the essayist, in 1907 on a woman who had had eight miscarriages and premature deliveries before the operation and who had six full term living babies by vaginal delivery after the operation.

(3) The technic of the operation, which can be done either vaginally or by laparotomy, has been described and the various steps illustrated.

(4) Seventeen cases have been performed by P. Strassmann, 92 were published by 47 other gynecologists, mostly in Europe, and five

were done by the essayist, giving a total of 114 known cases so far.

(5) The five cases of the essayist have been described in detail and illustrated by x-ray pictures and photographs taken during the operation. They were all done for childlessness, caused either by habitual abortions or sterility. Four full term pregnancies have occurred in three of these five women after the operation so far.

(6) The indications for the plastic unification are habitual abortions, sterility, severe dysmenorrhea and metromenorrhagia. Between 25 and 40 per cent of women with double uterus have no disturbances and do not need surgery.

(7) Hysterosalpingography should be done preoperatively to establish the exact size of the uterine bodies and patency of at least one tube. Intravenous urography is a preoperative must to detect abnormalities in the urinary system, not infrequent in these patients.

(8) There was one postoperative death in the early days giving a mortality of one in 114 or less than one per cent.

(9) There was no maternal death in 69 pregnancies following the operation.

(10) There was no uterine rupture during pregnancy or labor. Fifty-three full term babies were delivered *per vaginam*, only six by cesarean section.

(11) Fifty-eight babies out of 59 were living. One fetus died *in utero* in a case of placenta previa.

(12) The percentage of full term pregnancies in unselected cases of double uterus is about 25. In cases selected for operation it rises from 4 per cent before to 82 per cent after the operation.

(13) The percentage of miscarriages is 59 in unselected cases. It drops from 68 per cent in cases selected for surgery to 14 per cent postoperatively.

(14) The plastic unification of double uterus by restoring normal breeding space more than quadruples the chances of a living full term baby in indicated cases. It relieves dysmenorrhea and menorrhagia caused by this condition.

(15) The technically simple unification of the double uterus which completes the arrested natural development has become a standard procedure in Europe. It deserves a place in the textbooks and in the gynecologic practice of this country.

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DISCUSSION *(Abstract)*

Dr. Frank R. Lock, Winston-Salem, N. C.—Dr. Strassmann has presented a surgical approach to the management of the congenital anomalies of the uterus which result in its division into two cavities. He reviews the clinical problems presented by some of these patients, and places particular emphasis upon early and late abortion and sterility. He has collected 114 cases of plastic unification from the German and English literature since the procedure was described by his father in 1907, with 59 full term pregnancies following the procedure. Less than 50 per cent of the patients subsequently carried pregnancy to term since more than one pregnancy occurred for some of the patients. One patient had six babies, and another seven. It is very significant that 53 of the babies were delivered vaginally without difficulty in spite of the extensive uterine incision. This observation confirms to some degree our opinion that healing in the uterus is often adequate for labor with interval procedures in contrast to that which occurs following cesarean section.

My experience with 22 private cases with congenital anomalies of the female generative system, seen in the past five years, has been that in seven cases pregnancy was impossible. There were five instances of congenital absence of the vagina, one pseudohermaphrodite, and one congenital absence of the uterus in the presence of an adequate vagina.

Fifteen patients had duplication of the uterus with a bicornate uterus or uterus didelphys. Seven of these patients had 13 term pregnancies. In twelve of the thirteen there was an uncomplicated prenatal course and normal vaginal delivery. One instance of placenta previa totalis required cesarean section.

Three of the others had a history of abortion, one patient had three abortions at 20 to 24 weeks and one had a late abortion at 26 weeks, the third had abortions at 16 and 8 weeks. Three patients complained of sterility, and no other cause was found. The remainder had no complaints.

Dr. Strassmann has suggested the statistical figures of 25 to 40 per cent of these patients who go through life with normal menstrual function, pregnancies and deliveries. He has also pointed out that many of these patients may go through life without the abnormality ever being detected.

It is our policy to expect normal menstrual function, pregnancy and delivery for the patient with duplication of the uterus. Our concept does not relate this abnormality to the incidence of early abortion which is frequently explained by other pathological entities. We have recently appreciated the probability that uterine duplication may be directly related to late abortion, and it is entirely possible that we may undertake the Strassmann operation for some patients who have repeated late abortion in the presence of this lesion.

Dr. Strassmann has emphasized the importance of establishing the absence of any other possible cause for infertility before undertaking this procedure in the treatment of sterility, and although one of his cases was performed in the presence of occluded fallopian tubes, he indicates that this will not be considered again.

The fact that he has performed the procedure in only five cases indicates a careful selection of the patients for whom the procedure is recommended. It would be regrettable if the operation was generally abused without a careful selection of cases. Dr. Strassmann is to be congratulated upon bringing this problem to our attention.

Dr. Strassmann (closing).—The fact that we collected only 59 pregnancies from 114 cases does not mean that less than 50 per cent of the patients had full term pregnancies following surgery. Dr. Lock has overlooked our remark that the case of Dr. G. A. Wagner with seven babies following the operation was not included in our figures. Quite a number of the case reports were incomplete; some were published too soon after the operation before the patients had time to have their babies; others were without historic data and followups. For this reason it was entirely impossible to draw any conclusions on a percentage basis. Even the indications for the operation are known in only 81 cases. Another point which deserves consideration is that many cases were done in the years before modern tests for sterility especially tubal insufflation and hysterosalpingography were invented and used. It is therefore understandable that quite a number of the early patients were without offsprings for other reasons than their uterine duplicity. The fact that we had four full term pregnancies in our own five childless patients is indicative of much better chances than 50 per cent. As a matter of fact there is no surgical procedure for childlessness on account of sterility or habitual abortions which has so much as that to offer.

Careful selection of patients for this procedure is the secret of success as it is in every type and branch of surgery.

HERPES GESTATIONIS AND THE Rh FACTOR*

By EDWARD P. CAWLEY, M.D.
CLAYTON E. WHEELER, M.D.
and
PHILIP A. WILHITE, M.D.
Charlottesville, Virginia

Isosensitization by the Rh factor is the recognized etiologic agent in most cases of erythroblastosis fetalis and in some hemolytic transfusion reactions. In succeeding paragraphs will be described first the mechanism and significance of isosensitization by the Rh factor, followed by a description of herpes gestationis and the presentation of data which suggest that Rh isosensitization may also have to be reckoned with as a causative agent in some cases of herpes gestationis.

Isosensitization by the Rh Factor.—The subject of Rh isosensitization has become immoderately complicated since the Rh (Rhesus) factor was described and named by Landsteiner and Wiener[1] in 1940. The description of the mechanism and significance of Rh isosensitization presented here is a condensation of the subject which does not attempt to embrace all of its many aspects in detail. Individuals who possess the Rh factor are referred to as Rh-positive and those without it as Rh-negative. The Rh factor is present in red blood cells[2] and possibly also in various tissue cells.[3] Eighty-five per cent of white individuals have been shown to be Rh-positive and 15 per cent Rh-negative. Statistics for other races indicate that 95.5 per cent of Negroes are Rh-positive and 4.5 per cent Rh-negative; 98 per cent of Japanese are Rh-positive and 2 per cent Rh-negative; and 99.3 per cent of Chinese are Rh-positive and 0.7 per cent Rh-negative.[2] The incidence of erythroblastosis fetalis is in direct proportion to the number of Rh-negative individuals in the population, being relatively high in the

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*From the Department of Dermatology and Syphilology, University of Virginia Medical School, Charlottesville, Virginia.

*The authors wish to thank Drs. Arthur C. Curtis, G. Marshall Crawford and Raymond Goldblum for their assistance in supplying information about several of the nine cases.

white race and very rare among the Japanese and Chinese.[2]

The Rh factor acts as an antigen in those Rh-negative individuals who become sensitized to it and they develop anti-Rh antibodies. The antibodies occur in two chief forms and the multiplicity of synonyms employed for each has added to the confusion. One form is known as saline agglutinins (agglutinins, heat-labile antibodies, bivalent agglutinins, complete antibodies) and the other form as albumin agglutinins (agglutinoids, heat-stable antibodies, univalent agglutinins, incomplete antibodies, conglutinins, blocking antibodies).[4]

It has been assumed,[2] on reasonable grounds,[4 5 6] that minute quantities of fetal blood pass the placental barrier and enter the mother's circulation in the course of every pregnancy, but only about one among 25 Rh-negative women bearing Rh-positive babies becomes sensitized to the Rh factor by this means.[7] Transfusion or intramuscular injection of Rh-positive blood, on the other hand, may sensitize as many as one-half of Rh-negative individuals who receive it.[7] This variation has been explained by the difference in quantity of antigen administered to the Rh-negative individual[7] in pregnancy as compared with transfusion or intramuscular injection of blood. Recently it has been shown that injection of serum, as well as whole blood, may cause Rh sensitization.[7] It is important to note that the capacity for producing anti-Rh antibodies is probably dependent upon certain genetic properties and that some Rh-negative individuals apparently do not develop the antibodies even after several transfusions or intramuscular injections of Rh-positive blood or serum or after repeated pregnancies with Rh-positive infants.

Wiener[8] has pointed out that the mere presence of anti-Rh antibodies in a person's serum is of no significance and that only when anti-Rh antibodies and Rh-positive cells are present in the same body does illness result. This combination occurs in classic form when a sensitized Rh-negative patient (whose serum contains anti-Rh antibodies) is given a transfusion of Rh-positive blood, resulting in a hemolytic transfusion reaction, or when an Rh-positive fetus receives antibodies from the sensitized Rh-negative mother[8] resulting in erythroblastosis fetalis. An identical but less momentous combination, from the quantitative standpoint, may occur in the sensitized Rh-negative mother bearing an Rh-positive fetus during the latter half of pregnancy, when fetal blood presumably passes the placental barrier and enters the mother's circulation.[2]

Anti-Rh antibodies may disappear over a period of time but on renewed contact as a result of subsequent transfusions, injections of whole blood or serum, or subsequent pregnancies, the antibody-producing mechanism may respond rapidly with a new crop of antibodies, illustrating the "recall" or "anamnestic" phenomenon.[4] The discovery of anti-Rh antibodies during pregnancy does not necessarily foreshadow damage to the fetus because they may represent a "carry-over" from a previous pregnancy.[9] Weiner and his coworkers[10] have recently presented evidence to suggest that afibrinogenemia and serious hemorrhage may occur in an occasional sensitized Rh-negative mother carrying a dead fetus.

In from 5 to 10 per cent of cases of erythroblastosis fetalis the mother is Rh-positive thus excluding the possibility of Rh sensitization.[8] There is evidence[11 12] that many of these cases result from isosensitization induced by the A or B factors, in a manner similar to that already established for the Rh factor.

HERPES GESTATIONIS

Herpes gestationis has been concisely described as a form of dermatitis herpetiformis occurring in pregnant women. The eruption of herpes gestationis is usually symmetrical in distribution and the sites of predilection are the sacral region, posterior axillary folds, buttocks, abdomen and arms (*Figs. 1* and *2*). The lesions commonly appear in successive crops and are grouped. They may be vesicular, bullous, pustular, papular or polymorphous. Burning and itching, sometimes very intense, are the usual subjective symptoms. Residual hyperpigmentation, a salient feature of dermatitis herpetiformis, may be relatively insignificant or absent following herpes gestationis.[13] Varying degrees of eosinophilia may occur in both the cutaneous lesions and the blood[14] but this subsides as the skin clears.

Herpes gestationis usually appears during the fifth or sixth month of pregnancy (aver-

FIG. 1

Grouped bullae on the arm in a case of herpes gestationis.

age 5.3 months[15]) but is occasionally encountered in the first few weeks of gestation. The disease may occur during the first pregnancy but is commoner in subsequent gestations. In the later pregnancies it often occurs earlier and is more severe.[16] Attacks of herpes gestationis may be irregularly and inconsistently scattered through successive pregnancies.[13] The attacks are not related to the sex of the infant.[13 16]

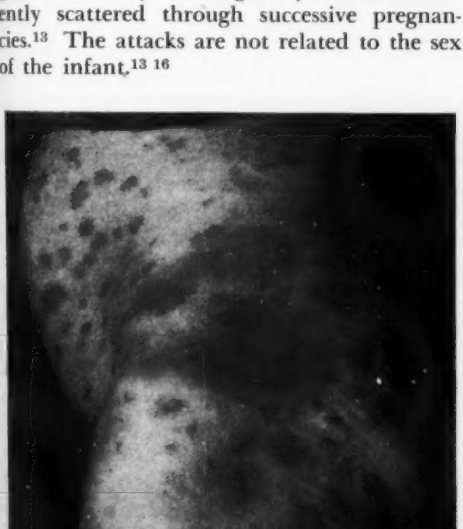

FIG. 2

Herpes gestationis.

The eventual prognosis for the mother with herpes gestationis is good, although symptoms during an attack vary from mild to rigorous. A fatal outcome in the case of the mother is excessively rare. The outlook for the infant is decidedly less favorable. Numerous authors[15-18] have remarked on the frequent occurrence of abnormalities among infants born to mothers with herpes gestationis. These abnormalities have included stillbirth, macerated fetus, jaundice, congenital malformations, and unexplained death of the infant shortly after birth. An investigator[13] who recently described 11 cases of herpes gestationis noted that among the 11 infants born to these mothers one premature baby was jaundiced and another had erythroblastosis.

The etiology of herpes gestationis is an enigma. Various investigators have implicated the following as causative factors at one time or another: (a) an endocrine disorder,[19-23] (b) sensitization,[24] anaphylaxis[25] an allergic phenomenon,[26] (c) injury to vasomotor nerves caused by toxins or ferments manufactured by fetal tissues or by cells of the chorionic epithelium,[27] (d) renal insufficiency,[28] (e) a toxic disturbance induced by impaired hepatic function,[29] (f) two reports describe the occurrence of herpes gestationis in patients with chorioepithelioma.[30 31]

ABSTRACT OF CASE OF RH ISOSENSITIZATION AND HERPES GESTATIONIS IN THE SAME PATIENT

C. E., a 19-year-old Rh-negative white woman, delivered her first child, a normal Rh-positive infant, at

full term after an uneventful pregnancy. About two years later, during the fifth month of her second pregnancy she developed for the first time a widespread vesicular and bullous, intensely pruritic eruption typical of herpes gestationis, which persisted until shortly after delivery. The eosinophil count in the peripheral blood rose to 18 per cent but returned to normal after delivery. The infant born of this pregnancy was full term, Rh-positive and had erythroblastosis, featured by a moderately severe degree of jaundice, but recovered. Saline agglutinins in a titer of 1:4 and albumin agglutinins in a titer of 1:8 were demonstrated in the mother's serum. Other laboratory studies gave normal results. During her third pregnancy, at the age of 24, the mother was completely free of any skin eruption and delivered a normal Rh-negative infant at full term. Antibodies were not demonstrated in this pregnancy.

DISCUSSION

The case abstract presented above suggests that isosensitization by the Rh factor may have been of etiologic significance in this example of herpes gestationis. Various data on nine other cases of herpes gestationis were available to us. Because of the rarity of herpes gestationis these data had been accumulated over a number of years and Rh studies were not done in many instances. It might be mentioned, however, that among the nine there were other provoking but inconclusive strands of evidence, such as the case of the Rh-negative mother who gave birth to an Rh-negative, an Rh-positive and an Rh-positive infant respectively and had herpes gestationis which started at seven months with the second pregnancy and at four months with the third pregnancy, but in whom anti-Rh antibodies were not demonstrated.

Further evidence which suggests the possibility of a relationship between herpes gestationis and Rh isosensitization is the following:

(a) Herpes gestationis may occur with the first pregnancy but is commoner in subsequent gestations. Rh isosensitization is likewise rarely encountered during the first pregnancy, unless previously induced by transfusion or intramuscular injection of blood.

(b) Herpes gestationis usually appears during the fifth or sixth month of pregnancy.[15] At about this same time, by comparison, minute quantities of fetal blood presumably begin to enter the maternal circulation,[2] giving rise to the potentially hazardous combinition of anti-Rh antibodies and Rh-positive fetal blood in the Rh sensitized mother bearing an Rh-positive fetus.

(c) Attacks of herpes gestationis may be irregularly and inconsistently scattered through successive pregnancies.[13] Interestingly enough, Rh sensitized mothers may bear Rh-negative and Rh-positive infants in irregular sequence through successive pregnancies but the significant combination of anti-Rh antibodies and Rh-positive blood can occur only when the infant is Rh-positive.

(d) Successive attacks of herpes gestationis are often of increasing severity.[18] Likewise, the hazards which accompany Rh sensitization may be augmented with each Rh-positive fetus because of the repeated stimulus to anti-Rh antibody-production.

(e) An investigator[13] who recently described 11 cases of herpes gestationis noted that among the 11 infants born to these mothers one infant had erythroblastosis and another was jaundiced and may well have had erythroblastosis, yet the expected incidence of erythroblastosis in the white race is once among several hundred births.

(f) Numerous authors[15-18] have remarked on the frequent occurrence of abnormalities among infants born to mothers with herpes gestationis. These abnormalities have included stillbirth, macerated fetus, jaundice, congenital malformations and unexplained death of the infant shortly after birth. The first three are also components of the erythroblastosis syndrome, and congenital malformations are about forty times as common among infants with erythroblastosis as compared with infants who do not have erythroblastosis.[32]

(g) Herpes gestationis is exceptionally rare among the Japanese and has never been encountered in two of the largest dermatology clinics in Japan.[33] Erythroblastosis, too, is very rare among the Japanese.[2]

Lastly, isosensitization induced by the A or B factors, which probably explains many cases of erythroblastosis occurring among infants born to Rh-positive mothers,[11 12] may likewise be of importance in some of the cases of herpes gestationis where Rh sensitization is not a factor.

The assembled evidence suggests, but obviously does not establish conclusively, the relationship of some cases of herpes gestationis to isosensitization by the Rh factor.

SUMMARY

The mechanism and significance of isosensitization by the Rh factor has been discussed followed by a description of herpes gestationis. Data have been presented which suggest that Rh isosensitization may have to be reckoned with as a causative agent in some cases of herpes gestationis.

Author's Note (7/26/52).—A recent report by Kaiser (Kaiser, Irvin H.): A Maternal Syndrome Associated with Isoimmunization and Fetal Death *In Utero*, Minnesota Medicine, 35:25 (Jan.) 1952, lends support to the concept that isoimmunization may be productive of recognizable symptoms, including cutaneous manifestations, in the mother. This author reports three examples of a maternal syndrome associated with isoimmunization. Features common to all three were a history of previous infant mortality due to erythroblastosis fetalis, the presence of high anti-Rh antibody titers, the sudden appearance of edema with sharp weight gain prior to term, and fetal death *in utero* shortly thereafter. Two of the three patients had severe pruritus.

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DISCUSSION (*Abstract*)

Dr. Clinton W. Lane, St. Louis, Mo.—Dr. Cawley says that an Rh sensitization reaction with a significant combination of anti-Rh antibodies and Rh-positive blood can occur only when the infant is Rh-positive. An argument against such a relationship would be the occurrence of herpes gestationis in a mother who bore an Rh-negative baby. In checking over our cases there was such an occurrence. Mrs. F., age 29 years, was seen in the fifth month of her second pregnancy. There was a patchy, erythemato-vesicular, squamous eruption with oozing and crusting of the upper and lower extremities. The patient said that a similar eruption had appeared during her first pregnancy with a disappearance shortly after the birth of the child. This patient was given daily injections of proluton® in a dosage of 100 mg. with a clearing of the eruption in four weeks. The mother and child were both Rh-negative.

Another argument against the relationship is that many more illnesses occur from hemolytic transfusion reactions than in pregnancy. I have been unable to find a report of an eruption resembling dermatitis herpetiformis or herpes gestationis in any of these patients and if there was a direct relationship such an eruption should occur.

Herpes gestationis is an eruption peculiar to pregnancy and in our experience the greatest benefit has been by the administration of progesterone and in one patient with testosterone. This suggests that the disease has some endocrine basis. Mrs. C. was first examined in 1943, eleven days after the delivery of her first child. An eruption of the palms and forearms had begun five days after delivery and a diagnosis of erythema multiforme was made. The eruption cleared within two weeks. The patient was seen in 1946 in the fifth month of pregnancy for an eruption involving the trunk and extremities, which was diagnosed as herpes gestationis. The patient was intolerant to sulfapyridine, but the eruption cleared with four injections of testosterone. The eruption recurred and failed to clear until the mother delivered a one month's premature baby in May. The eruption exacerbated after the delivery of the baby and again was relieved by the injection of testosterone. She was again examined in March, 1950, in the fourth month of pregnancy. At that time there was a most extensive

and severe vesicular and bullous eruption and the patient was seen by Dr. John H. Lamb, who recommended intramuscular injections of progesterone in a dosage of 100 mg. daily. These injections produced considerable improvement for a time, but there was an exacerbation and again improvement occurred when 200 mg. daily were administered. The eruption did not completely disappear and the patient was delivered in August. Her eruption finally disappeared two months after the birth of the child. The mother and baby were both Rh-positive.

It has been my privilege to examine and treat five mothers with herpes gestationis. The total number of children of these mothers is eleven. None of these children has had erythroblastosis or any congenital anomaly.

Finally I doubt that herpes gestationis and dermatitis herpetiformis are identical diseases because of the following facts:

HERPES GESTATIONIS

Occurs only in pregnant women.
Only slight residual pigmentation.
A polymorphous eruption.
Disappears spontaneously within a few weeks after termination of pregnancy.
Slight or no benefit from sulfapyridine.
Improved by progesterone.

DERMATITIS HERPETIFORMIS

Occurs equally in men and women.
Considerable pigmentation and scarring.
Vesicular and bullous eruption.
Very persistent and tends to recur.
Sulfapyridine almost specific.
Progesterone not beneficial in a small number of cases.

Dr. Francis A. Ellis, Baltimore, Md.—Drs. Cawley, Wheeler and Wilhite suggest that the Rh factor may play a role in herpes gestationis, because the babies of mothers with this disease may show developmental abnormalities, but of the three cases I have seen with this condition, all the infants were normal.

One patient had had a previous spontaneous abortion at three months and her Rh factor was positive. This patient developed an anemia while on sulfapyridine, but the eruption responded well to cortisone.

In all three cases the eruption cleared following delivery.

In my cases it was the patients' first full-time pregnancy. As the authors suggested, the eruption did occur in the latter half of the pregnancy in all three. So far as I know there has been no recurrence in any of my patients, but they were not seen in subsequent pregnancies.

The patient presented two days ago by the local members as herpes gestationis or dermatitis herpetiformis had a positive Rh factor.

It is also to be noted that we have also seen a moderate number of cases of dermatosis or pruritus late in pregnancy which may also have to be considered as due to the Rh factor, but I cannot supply the data on this, in my cases.

Dr. Cawley (closing).—The etiology of herpes gestationis has been an enigma for as many years as the disease has been known. The evidence which we have been able to assemble suggests that some cases of herpes gestationis may be related to isosensitization by the Rh factor.

THE MANAGEMENT OF PTERYGIA WITH PARTICULAR REFERENCE TO RECURRENT PTERYGIA*

By GEORGE M. HAIK, M.D.
RICHEY L. WAUGH, JR., M.D.
WOOD LYDA, M.D.
and
GEORGE S. ELLIS, M.D.
New Orleans, Louisiana

It seems appropriate that ophthalmologists from New Orleans should discuss the subject of pterygium before members of the Southern Medical Association. In the more than 135,000 ophthalmic operations which Dimitry[1,2] collected in 1937 from almost every part of the country, (1) New Orleans had a larger percentage of pterygium operations than any other city, (2) Louisiana a larger percentage than any other state, and (3) the southern states a good representation in the pterygium belt which he postulated for the country as a whole. While there are statistical errors in representation, as Dimitry himself pointed out, he was most correct in his emphasis upon the problems which this condition and its recurrences present in many parts of the South.

The seriousness of pterygia is apparently not well appreciated. The operations employed for its correction are often not so simple, nor are the results which they achieve so good, as many seem to believe. The rate of recurrence after operation is actually very high. In Egypt, a country in which pterygium has been recognized since ancient times, Kamel,[3] in 1946, reported that 30 to 50 per cent of all operations performed by the McReynolds technic were followed by recurrences. Our own surgical experience, chiefly with the same operation, suggests that when

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*From the Department of Ophthalmology, Louisiana State University School of Medicine, New Orleans, Louisiana.

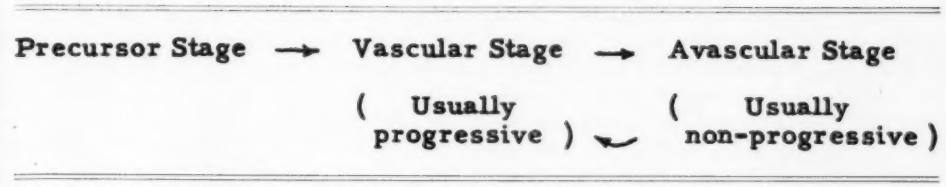

FIG. 1

Schematic representation of progressive stages in the natural history of pterygium.

examination is carried out with the slit lamp, the rate of recurrence is more nearly 60 to 75 per cent. We are in agreement with King's[4] remark that "One may justifiably suspect that in a series in which no failures are reported the patients have not been carefully followed." This is an unfortunate state of affairs since treatment of recurrent pterygium is even more unsatisfactory than in the treatment of the original lesion. Surgical measures, regardless of what they are, are only too often followed by a greater deformity than existed before secondary surgery was undertaken.

PATHOLOGIC PROCESS

The pathologic classification of pterygium differs from author to author. Two primary types are generally recognized, the vascular and the avascular, and two secondary types, pseudo-pterygium and recurrent pterygium. Our own observations, in an area in which this lesion is extremely frequent, have led us to believe that these types, instead of being separate entities, are progressive stages of the same pathologic process (*Fig. 1*). They have also led us to believe that they are preceded by another stage which we have termed the precursor stage.

Precursor Stage.—Although the discussion of the etiology of pterygium is no part of this paper, one or two etiologic factors must be mentioned. In this part of the country, at least, Dimitry's[2] investigations seem to have excluded such mechanical causes as wind and dust as of any significance in its development. Inflammation, on the other hand, seems extremely important. Our own observations have convinced us that inflammatory changes are usually present in a patient with pterygium who is carefully questioned and properly examined. The increased incidence in the tropics, where a so-called malignant form occurs, is well known, and it is difficult to refrain from setting up a cause and effect relationship between infection and pterygium in those parts of the world where heat and moisture are conducive to biologic growth.

In this semitropical climate we have repeatedly observed many raised conjunctival lesions (*Fig. 2*) associated with symptoms and signs of inflammation, which in time encroach upon the cornea. In this and other clinical respects they bear a close relationship to pterygia. In their early stages many of them may erroneously be diagnosed as inflammatory lesions superimposed upon pingueculae or as associated with bulbar lesions of allergic origin. These elevated, thickened conjunctival lesions, characterized by varying degrees of vascularity and varying amounts of subconjunctival connective tissue, we regard as precursors of true pterygia. As a corollary, we believe that prompt and effective treatment may prevent many from developing into true pterygia with corneal overgrowth.

Vascular Stage.—The vascular stage of pterygium has long been recognized as progressive. In the proliferative stage, the lesion becomes larger and more elevated, there is an increase in connective tissue and in the number of conjunctival and episcleral vessels. In tropical climates these changes may be so marked that the stage is truly malignant.

FIG. 2

Pterygium precursor with vascular changes in the conjunctiva.

Avascular Stage.—The avascular stage of pterygium is not progressive. At this stage the lesion has a pale and tendinous appearance. It is only slightly elevated from the surface of the globe, and few vessels can be demonstrated in it. According to Gerundo,[5] there are two forms of avascular pterygia. The first is the fibromatous form, in which there is an unusual amount of connective tissue in the rather avascular subconjunctival tissue. The atrophic-sclerotic form, which develops from the fibromatous form, is characterized by atrophy of the conjunctival epithelium, together with sclerosis and hyalinization within the subepithelial layers. The connective tissue substance may become amorphous and calcium deposits are occasionally seen.

Pseudopterygium and Recurrent Pterygium.—The term recurrent pterygium is commonly used to designate the lesion which is more properly called pseudopterygium and which represents an almost constant response of the cornea and conjunctiva to the trauma of surgery. Recurrent pterygium is a true recurrence and is often the result of faulty surgical technic. Mixed forms may sometimes occur and both types may present much the same appearance. However, recurrent is more vascular and contains greater amounts of scar tissue. It is essentially a proliferation of connective tissue elements and epithelium over the area denuded at operation. For this reason the postoperative deformity may actually be greater than the original growth and proportional to the amount of tissue removed in order to accomplish complete removal. Pseudopterygia may be extremely vascular, though sometimes the blood vessels are so minute that they can be visualized only by slit lamp microscopy. Contractures may eventually occur from connective tissue elements.

GENERAL CONSIDERATIONS OF THERAPY

Since pterygium is a progressive pathologic process, one may relate the necessity of therapy to each stage. In the precursor stage treatment is prophylactic. It consists of the removal of any possible source of external ocular disease and the maintenance of a normal conjunctival flora by the intelligent use of various antibiotics now at our disposal. Vascular pterygia require active treatment. Lesions which present the greatest vascularity are especially prone to recurrence and require particularly careful treatment. Since the avascular stage is not progressive, surgery is not generally indicated except for cosmetic purposes. It may also be indicated in the occasional lesion which suddenly becomes vascular and progressive, for reasons not always clear. The adequacy of measures taken to prevent the development of pseudopterygia or to hold them in check determines the success of pterygium surgery.

Medical Measures.—Medical measures should be employed routinely in all conjunctival lesions in which symptoms and signs of inflammation suggest that they are precursors of true pterygia. The special measures employed depend upon the circumstances of the individual case. Disease of the adnexa, which may be keeping a conjunctivitis active, should be corrected as well as any refractive errors which may play a role in congestion, irritation and their sequelae.

Since chronic conjunctivitis is a mixed infection, agents with a wide spectrum of activity should be chosen when antibiotics are indicated. Cortisone is useful locally to control hypersensitive and inflammatory responses. Antibiotic agents should be administered along with it, because in this type of therapy concurrent infectious processes may continue to exist or may develop without clinical manifestations. Vasoconstrictor drugs are useful in relieving congestion and discomfort in the patient with an allergic background.

With nutritional deficiencies, vitamin A is given orally to encourage the formation of normal epithelium on the cornea and conjunctiva when abnormal stratification of cells may provide foci for bacterial growth. The margin of safety is notably large but it is well, especially in older persons, not to exceed dosages of 100,000 to 500,000 units per day if the administration is to continue over a period of weeks. It is true that most reports of reactions to excessive amounts of vitamin A have concerned children, but hypervitaminosis is also recognized as a definite entity in adults.[6]

Primary Irradiation.—Both x-rays and radium have been used in the primary treatment of pterygia with many favorable results. Many other irradiated pterygia must later be treated surgically if only on cosmetic indications. Irradiation is not always effective in the obliteration of older blood vessels in a dosage

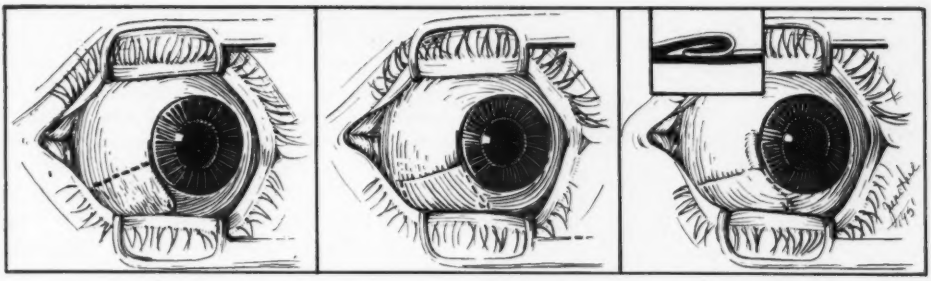

FIG. 3

Appearance of operative field after completion of the pterygium transplant. Note folding under of the limbal edge of the conjunctiva.

that is considered safe. It may, therefore, be preferable to use irradiation only postoperatively, when it is especially effective in controlling new vessel formation.

Surgical Measures.—The objective of pterygium surgery is to alter the pattern of growth, so that corneal re-epithelization outward toward the limbus will be more rapid than regrowth of the pterygium inward. With early covering of the denuded cornea by epithelium, there is less likelihood of formation of scar tissue and an operative failure. It is particularly important that operation be done early, so that any scar remaining from the necessarily wide excision does not cover the central cornea and thus further reduce visual acuity.

The type of operation selected depends upon the size and vascularity of the pterygium to be removed.

(1) In small pterygia, excision and suture may be all that is necessary.

(2) In larger growths which are relatively avascular the McReynolds modification of the original Desmarres transplant is undoubtedly the most satisfactory of all the procedures available. It has, nonetheless, an unfortunately high rate of recurrence and is not at all satisfactory for lesions which are extremely vascular.

It has been our practice for some time to add to this procedure a step not described in the original McReynolds operation. After the head of the pterygium has been buried in the cul-de-sac, the limbal edge of the transplant is inverted, thus ensuring that an epithelial surface, and not the connective tissue surface of the pterygium, lies against the denuded operative site (*Fig. 3*). It is our impression that healing occurs with less frequent and less extensive encroachment of connective tissue and new vessels over the denuded cornea than when this step is omitted.

Whenever sutures are required, silk should be used, just as McReynolds originally advocated. The surgeon who disregards his advice and uses catgut in the conjunctiva is inviting an inflammatory response and encouraging recurrence.

(3) In primary pterygia which are highly vascular, as well as in recurrent pterygia, the operation of choice is exposure of the limbal sclera with resection of the pterygium. When the transplantation operation is used for highly vascular pterygia, the rate of recurrence is high and the cosmetic results are poor because the buried head forms an unsightly mass in the exposed palpebral fissure.

The head of the pterygium is dissected free from the underlying cornea and the dissection is carried posteriorly over the sclera until all scar tissue has been freed from its attachments. The head is then resected. Great care must be taken not to perforate the cornea or the sclera, since this accident would be followed by loss of intraocular fluid or prolapse of uveal tissue. Loss of anatomic relationships makes it difficult to determine the limits of the cornea and also makes it easy to detach a rectus muscle without realizing, until too late, what has happened. The amount of granulation tissue present is always greater if more than one attempt has been made to correct the recurrence. The area of denuded sclera left after operation depends upon the size of the primary or recurrent growth (*Fig. 4*).

Postoperative Cortisone Therapy.—The remarkable results accomplished in inflamma-

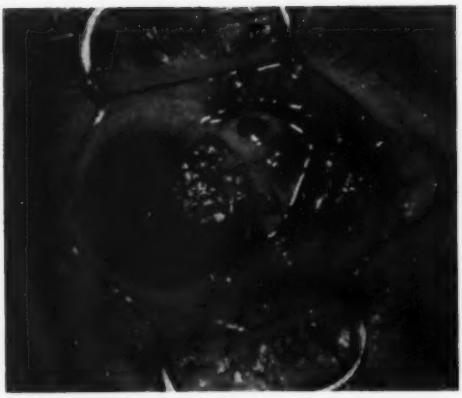

FIG. 4

Appearance of operative field after excision of a recurrent, highly vascular pterygium, showing exposed sclera.

tory conditions of the eye by the local use of cortisone seemed to warrant an investigation of the possible benefits of its topical use following pterygium surgery. It seemed reasonable to hope that the suppression of inflammation observed clinically in allergic diseases and the decreased keratoblastic proliferation, with no impairment of epithelization, observed experimentally[7] might encourage epithelization of the area denuded at operation before ingrowth of connective tissue.

Accordingly, cortisone ointment* was used topically on a small group of patients for six weeks after operation. Serial pictures were taken of the eyes and repeated examinations made by slit lamp microscopy. Any evidence of corneal vascularization observed under the slit lamp, however slight, was regarded as indicative of pseudopterygium formation and the case classified as a failure.

The trial was discontinued after the eleventh patient had been treated because, by this criterion, no case was successful. Several in the group had the so-called malignant type of pterygium. Seven had undergone transplantation operations for primary lesions and the other four had had recurrent lesions excised. Every patient in the group sooner or later showed evidence of corneal vascularization. It was sometimes observed as early as six weeks. The period of observation had been initially set for three months, but in fairness to the patients, irradiation was resorted to without further delay if early vascularization was observed.

In a number of cases in which, for one reason or another, irradiation was not employed, and recurrence was therefore not halted, examination several months after cortisone therapy had been discontinued showed that the recurrent lesions contained much less fibrous tissue than was expected. The results in this regard were so striking that we are now using cortisone in combination with irradiation to control new vessel formation after operation, in the expectation that a synergistic effect will be obtained. We are not yet prepared to report upon the results of this combined therapy.

From the symptomatic standpoint the results of cortisone therapy were excellent. Postoperative inflammation was much milder than usual. There was marked relief of pain. All four patients who had undergone secondary surgery commented on the postoperative relief obtained without analgesics, in contrast to their experiences in previous operations.

Postoperative Irradiation.—Recurrences can be expected in a large proportion of pterygium operations, regardless of the technic of removal. The best method of preventing recurrence, whether the operation is a primary transplant or excision of a recurrent growth, is by some method of irradiation. We believe that no surgical procedure for recurrent pterygium is complete until it is followed by irradiation to control the neovascularization which otherwise can be expected to occur.

Of the various methods now available for this purpose, our own preference is irradiation by means of the radium applicator devised by Iliff.[8] It has the great advantage of stability. It does not require prolonged treatment times. It is constantly available for use at any time irradiation is indicated during the necessary period of close postoperative observation. Our results with the radium D applicator were never so consistent, and the obliteration of new blood vessels was never so complete as with the Iliff applicator. By practicing the precautions necessary in the use of radium, no great dangers are encountered by the operator in use of the Iliff applicator.

We have been using this applicator for more than four years for a variety of anterior ocular disease and have observed that the greatest benefits are in the control of neovas-

*Supplied in 5-gm. tubes by Merck and Co., Inc.

cularization, especially after operation. Since the prevention of new vessel formation is the key to the prevention of recurrence after pterygium surgery, and since recurrent pterygia are notable for their vascularity, irradiation is a frequently necessary postoperative measure after pterygium surgery.

Routine of Management.—The Iliff applicator is applied immediately after the pterygium surgery has been completed. The dosage is 3 to 6 minutes. The higher dosage is used when the growth is markedly vascular. If the denuded area is large, it may be necessary to make the applications, so that all parts are treated. Care should be taken that the applications are not overlapping.

After the first application, the method of management is flexible and is adapted to the necessities of the individual patient. This is made possible by close postoperative observation, particularly during the first week. During this time we may make one or two more 3-minute applications. Thereafter applications are given depending on slit lamp evidence of fragmentation and new vessel formation. The total dosage never exceeds 15 minutes and is usually considerably less. Quite early in our experience we abandoned the plan of 10-minute applications at weekly intervals which Iliff[8] advises, finding that the flexible plan just described accomplishes equally good results with a considerable reduction in total treatment time. Routine therapy is not so desirable a mode of treatment as therapy only upon indications, because it may take three or four days to a week or more for the fragmentation of blood vessels and their absorption to take place and time must be allowed for the complete effect to become manifest.

New vessel formation may extend into the area of irradiation from adjacent nonirradiated areas. The edge of the irradiated side must therefore always be carefully examined, in order not to overlook early evidence of formation and extension of new vessels into the cornea. One should also remember that irradiation, even in therapeutic dosages, will not be effective in inhibiting new vessel formation unless all sources of irritation are avoided after operation.

Results.—Fragmentation of blood vessels is the clinical measure of the effect of irradiation. It is sometimes possible to follow it grossly. More often, slit lamp microscopy is necessary. Fragmentation occurs more readily in new and smaller blood vessels. Older vessels, in which the lumen is larger, are slower to respond and require larger amounts of irradiation for their obliteration.

The first changes in the blood vessels are observed three or four days after irradiation. Under the slit lamp, the vessels present what seem to be irregular saccular enlargements. Occasionally blood escapes from them. If the extravasated blood is small in quantity, it presents a finely granular, brown or orange appearance, probably due to reflection from the thin layer of red blood cells. If the amount is larger, a greater depth of the layer may account for the more brilliant red color observed. These changes have been demonstrated in cases treated primarily by irradiation, without operation, and therefore cannot be explained as subepithelial areas of hemorrhage such as are sometimes seen after surgical trauma.

About a week after operation, if dosage has been adequate, fragmentation of the blood vessels will be more complete. There will be a diffusely red, granular or dust-like appearance and no formed vessels can be seen. These minute fragments (*Fig. 5*) are later absorbed and the area is left free of debris. The only vessels then remaining are the larger ones that have been unaffected by the dosages of irradiation used.

The larger dosages of irradiation required for the obliteration of older and larger vessels may cause characteristic conjunctival changes. The conjunctival vessels are enlarged and ir-

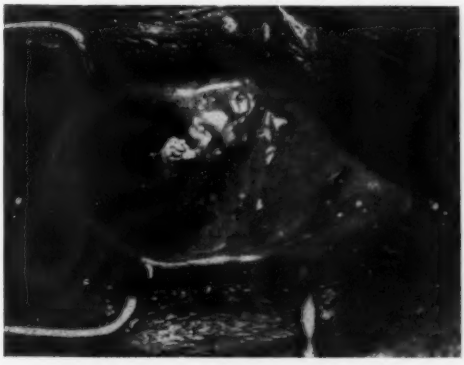

FIG. 5

Appearance of an eye eleven days after excision of extensive recurrent pterygium and irradiation with Iliff applicator. Note fragmentation of vessels.

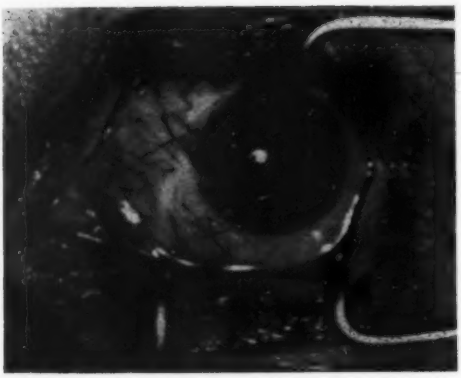

FIG. 6

Appearance of an eye three years after excision of recurrent pterygium and irradiation with Iliff applicator. Note telangiectatic vessels.

regular and have a telangiectatic appearance (*Fig. 6*). The changes are probably to be explained by a proliferative reaction in vessels whose lumen is so large that obliteration has been incomplete. Fortunately these vessels, in spite of their unsightly appearance, do not appear to be harmful.

Postoperative Care.—From all observations it appears that postoperative care should consist of irradiation both to prevent and to control new vessel formation. Congestion may sometimes follow irradiation and be responsible for a painful ciliary spasm. This may be prevented by the instillation of atropine or scopolamine at operation, and by the use of homatropine before subsequent irradiations.

Chemotherapeutic and antibiotic ointments should be used to control infection.

Bandaging should be continued for seven to ten days. By the end of this time healing is usually sufficiently far advanced to make it safe to uncover the eye while the healing process goes on to completion in the next few weeks.

Duction exercises should be begun immediately after operation in order to prevent any limitation of motion. This is especially important after removing large or recurrent pterygia, when any adhesions beginning promptly at the operative site will soon be followed by secondary contracture.

Local cortisone should be used because of its effect in inhibiting postoperative pain, inflammation, and fibrous tissue formation, with less corneal scarring.

SUMMARY

There is a high rate of recurrence in pterygium surgery.

Medical treatment of the precursor stage may prevent development of a true pterygium with corneal overgrowth.

Surgery should be performed before occurrence of corneal overgrowth.

The object of pterygium surgery is to allow corneal re-epithelization before formation of scar tissue.

The limbal surface of the conjunctiva should be turned under following completion of a McReynolds transplant.

Exposure of the limbal sclera with resection should be performed on recurrent and highly vascular primary pterygia.

Close postoperative care is essential.

Cortisone appears to inhibit the postoperative formation of scar tissue.

No surgical procedure for recurrent pterygium is complete unless it is followed by irradiation.

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DISCUSSION (*Abstract*)

Dr. R. L. Waugh, Jr., New Orleans, La.—It might be well to say a few words about possible dangers to the operator in the use of the radium applicator. If precautions are taken, we do not believe that these dangers are serious. The operator, however, must be constantly aware that radium is an active substance and that the gamma rays emitted possess much greater

penetrating power than the less penetrating beta rays, which have only a superficial effect. The presence of approximately one gamma to about thirty beta rays allows safe use of radium.

Precautions in the use of the 50 mg. radium applicator devised by Iliff, are based on the following considerations:

(1) The intensity of the irradiation delivered to the operator is inversely proportional to the square of the distance between the radium and his body. Thus the further away, the greater the margin of safety.

(2) The National Bureau of Standards has recently recommended that no single person be subjected to a body exposure time of more than 0.05 gamma roentgen units daily, or more than 0.3 gamma roentgen units weekly. If these safety limits are observed, it is believed that a cumulative dosage of gamma irradiation will not be received.

(3) The tolerance of the hands to irradiation is considerably higher than that of the body.

(4) At a distance of 28 cm., which is the length of the handle of the radium applicator, the output of gamma rays is less than 0.5 gamma roentgen units per hour. This has been established by both theoretical calculation and actual measurement of emanation with a Victoreen minometer.

In actual measurement a fountain pen type of cartridge carries a charge which is affected by gamma rays. After exposure over a given period, the cartridges are placed in the instrument and one can read off directly on a scale the amount of exposure to gamma rays to which one has been subjected. On the basis of such readings one can confirm the theoretically calculated time of safe exposure and also determine by clipping the cartridge to one's clothing whether one is receiving in daily use more than the safe daily exposure.

(5) Considering the gamma roentgen output of the radium applicator and the recently recommended periods of safe daily and weekly exposure to irradiation, one may safely hold the tip of the handle of the radium applicator for a period not greatly exceeding 6 minutes a day over a six-day week. Such an estimate is based on body dosage, rather than a higher dosage tolerance of the hands, and is therefore, believed to be well within limits of cumulative dosage.

(6) Where one would be giving a considerable number of radium applications in the office, it may be well to alternate use of office personnel so that each, in holding the applicator for a few minutes at a time, does not give a total of more than 6 minutes treatment a day.

(7) Complete blockage of all gamma irradiation from 50 mg. of radium theoretically requires a thickness of about 4.5 inches of lead. In practice, the applicator is stored in a lead container with a wall 2.5 inches in thickness and is kept in a room not in general use. Safety is thus obtained through the inverse square law.

AN ELECTROLYSIS APPARATUS WITH ADDED REFINEMENTS*

By HARWELL DAVIS, JR., M.D.†
and
RAY O. NOOJIN, M.D.‡
Birmingham, Alabama

The dermatologist may experience some difficulty in purchasing an inexpensive satisfactory apparatus which can be used to remove superfluous hair safely and permanently. The machine presently to be described delivers a small, direct current of low voltage. The source of energy is obtained by attaching the instrument to an ordinary base plug (110-120 volts alternating current). The cost of materials does not at the present time exceed $30. A capable radio repairman should be able to assemble the machine in approximately two hours. While it is recognized that other types of machines utilizing high frequency current, multiple needles, and so on, are preferred by some,[1-7] nevertheless the presently described apparatus appears to have several advantages, to wit: (1) low cost, (2) uncomplicated and rugged construction, (3) clinical application is technically easy and (4) pain is minimal.

MATERIALS AND METHOD

The materials required include:

(1) 6 x 5 x 4 steel meter case
(2) Handle for meter case
(3) Pilot light holder with 110 volt pilot light
(4) Line cord with plug
(5) Dial plate graduated, 0 to 100, 270° rotation
(6) Pointer-type knob
(7) Two jacks (or binding posts), one black, one red
(8) Two plugs to fit binding posts
(9) One inch angle bracket
(10) Rubber grommet for power cord hole
(11) Three tie point strips with two lugs each
(12) Three feet of hook-up wire and 6 inches of Ersin solder
(13) Two 6.3 volt, 1.2 ampere filament transformers (Stancor P 6134)

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†Department of Pathology, Northwestern University Medical School, Chicago, Illinois.

‡Department of Dermatology and Syphilology, Medical College of Alabama, Birmingham, Alabama.

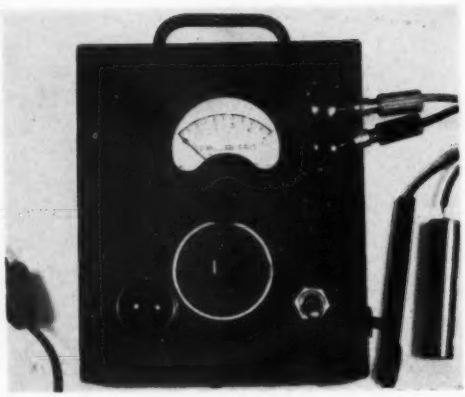

FIG. 1

Front view of the instrument and electrodes.

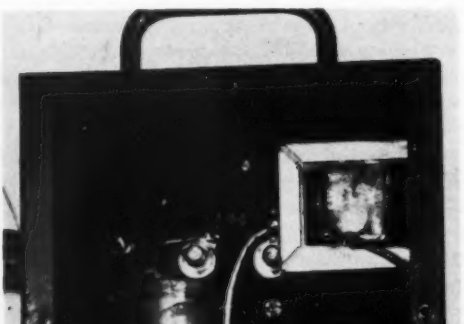

FIG. 2

Rear view of the instrument with rear cover removed.

(14) Needle holder (made from brass stock and fiber rod)

(15) Indifferent electrode (plug nickel plated water pipe with brass slugs with lead soldered to one end)

(16) Selenium rectifier, 65 ma. (Federal type 100 2 A)

(17) Milliammeter, graduated 0 to 5 ma. (Triplett type 227 T)

(18) Filter net (three 500 ohm 1 watt resistors, two 40 mfd. 150 volt condensers)

(19) D.P.S.T. switch

(20) 50,000 ohm wire wound potentiometer (linear taper) (Clarostat)

The machine is constructed as illustrated in *Figures 1* and *2*. The schematic diagram is shown in *Figure 3*. A selenium rectifier is used instead of the vacuum tube type since it greatly reduces the size of the instrument, eliminates the necessity of a warm up lag, and reduces the fragility of the instrument. The milliammeter remains as the only breakable part, and it is relatively rugged. Two ordinary filament-type transformers connected back to back serve as an isolation transformer. This arrangement eliminates the possibility of grounding and shock should the patient inadvertently touch a metallic object. A filter net is inserted between the rectifier and patient to remove the residual alternating current and to reduce the likelihood of the patient having a burning sensation when the instrument is used. The technic to be used and the clinical application are similar to that described by Cipollaro.[1]

SUMMARY

Instructions for the construction of an inexpensive electrolysis apparatus with added refinements are presented.

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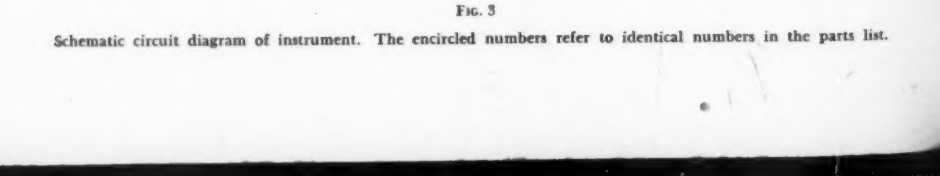

FIG. 3

Schematic circuit diagram of instrument. The encircled numbers refer to identical numbers in the parts list.

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THE HEALTH ASPECTS OF CIVIL DEFENSE*

By JOHN P. SMOUSE†
Oklahoma City, Oklahoma

There is a tendency on the part of many of us to think of civil defense as a program that can be developed in a short time. Nothing could be further from the truth. We are going to need a civil defense program as long as the world is divided into two opposing groups of nations. In past wars, the civilian population of the United States was relatively free from the likelihood of direct attack. With the advent of modern weapons, we can no longer act on this premise if we expect to survive as a nation of free people.

The development of a reasonably adequate civil defense program is a tremendous undertaking. It will require as much planning and training as that needed to prepare our armed forces for war. It is recognized that to equip and train an army requires several years. It is certainly not unreasonable to expect that five to ten years will be necessary to develop a civil defense program to the minimum level of effectiveness. One of our greatest handicaps will be the lack of interest on the part of the average citizen. This must be overcome as a prerequisite to the successful accomplishment of our purpose. To the extent that we fail in this task, we are going to pay in needless loss of lives.

The National Security Resources Board, in order to assure uniformity in the plan for civil defense, has recommended that the plans be developed around nine services. These are: welfare, rescue, warden, public works, fire, police, public warning, plant protection, and health services. It is important that all states develop their civil defense program and organization on a similar pattern in order that coordination can be assured between areas to provide mutual assistance.

It is also essential that all of the services make the maximum use of existing agencies, facilities and personnel if they are to accomplish their objective without causing undue waste of manpower. This is most certainly true of health services. Consequently, the planning for the health services must be coordinated not only with the other services but with all governmental and other agencies which are capable of assisting in the program. For example, the American Red Cross has for many years conducted a program of first aid training. It would be unwise for us to set up a separate training program to accomplish this part of our work. Rather than that, we should endeavor to augment and assist them in expanding in this field.

The Health Resources Division of the National Security Resources Board recognized the need to use existing agencies to the fullest extent by recommending to the states that the state departments of health be given the responsibility for the health services for civil defense in their respective states. This recommendation has been generally followed throughout the country. Certainly, the health departments will follow the suggestion of making full use of all related agencies and organizations to accomplish their task. In addition, all services must be sure that they coordinate with the other services on such matters as transportation, as there will not be enough facilities to fill all of the needs. The planning must be done with a view to keeping the requirements to the absolute minimum, consistent with the fulfillment of our responsibilities.

The services that must be provided in this program can be divided into two broad types: (1) the care and treatment of casualties and the ill; and (2) those activities dealing with prevention of illness and injury and related services. Under care and treatment, we have such items as personnel, hospitals and facilities, and treatment. In the field of preventive medicine and related services, we have immunization, epidemiology and reporting, sanitation, monitoring, mortuary services, industrial health, laboratory, and nutrition.

The shortage of personnel is one of the

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†Sanitary Engineer, Oklahoma State Department of Health.

problems with which the health services must deal. There is an insufficient number of physicians and nurses to fill even peacetime needs. The situation becomes even more acute when the armed forces draw upon the already limited number to fill their requirements. It is obvious that unless careful plans are made to make full use of these persons, the results can be disastrous. Unfortunately, these types of personnel are not readily trained. It requires a number of years to train a physician and it is likely to be a long time before we have enough doctors adequately to fill all of our requirements.

Another difficulty we face in the allocation of doctors is the fact that the casualties produced by attack will be an added load over and above the everyday illnesses. We shall have the usual number of people in the hospitals when disaster strikes. Arrangements must be made that will provide the maximum care for both of these groups of patients. The same situation of shortage of personnel exists to a lesser extent with the nurses, as well as in some other fields, such as laboratory personnel.

These deficiencies must be overcome by so organizing the work to be done that the same number of persons can accomplish more work. One way in which this might be done is to keep a roster of all physicians in the state. This pool of doctors would be broken down into categories. First, the doctors subject to military call would be set aside to be used in positions where their loss would not leave key positions vacant. The physicians would then be set up in teams. Each team would have a specific task to do in case of disaster. Part of the teams would be assigned to care for the patients already in hospitals and those that could be treated in addition to the normal load. Other teams would service emergency hospitals. Still others, perhaps smaller teams, would be needed for field work such as in aide stations. It is likely that nurses will be used to perform certain of the duties normally reserved for the doctor. In turn, nurses aids will need to be used to perform some duties ordinarily done by the nurses. This method obviously will result in some loss of efficiency of treatment and care. The alternative appears to be no care at all for large numbers of people.

The work of the laboratory personnel must be accomplished by the training of other people prior to the time of need. Auxiliary personnel can be trained to a sufficient extent that the qualified man can direct the efforts of a number of assistants when the need arises. Here, again, we shall not have the highest quality of service but must accept what can be done under the circumstances.

Surveys must be made to determine what hospital facilities are available for use. We must know how many patients can be handled at each hospital on an emergency basis, what buildings can be converted to emergency hospitals, how many beds can be provided, and how supplies and personnel will be provided. This is going to take careful planning and some time but can and should be accomplished as soon as possible. Preliminary plans can provide for the removal of many convalescent patients to their homes in case of attack. This will provide a considerable amount of bed capacity for emergency patients.

The problems mentioned so far in the discussion are only a part of those which the health services face in providing treatment in event of attack. It is logical to assume that the medical associations and the hospital associations will be the groups that we must lean upon to develop plans that will provide the treatment and hospital facilities necessary in event of emergency. In addition to the previously mentioned problems, they will be concerned also with the development of standard treatments for burns, injuries and radiation; and with the question of supplies of medicines, dressings and instruments. There is almost no limit to the amount of planning and effort that can be put into this phase of the program, but the fact remains that the more effort we put forth now, the less will be the loss when an attack occurs.

We all recognize that the success of any program is dependent upon good planning and organization, the proper dissemination of information, a sufficient knowledge and understanding on the part of those who are to function, and enough field training to provide experience for those who are to carry on the work. This applies to the care of casualties and the ill as well as the remaining aspects of the program yet to be discussed.

With only one or two exceptions, we can say that the rest of the responsibilities under civil defense which have been delegated to the

health services are those which in peacetime fall in the field of public health. The matter of immunization certainly must be considered in preparing for civil defense. The immunization of children against diphtheria, whooping cough, tetanus, and smallpox is one of our present public health objectives. The effort along these lines should be increased as much as possible. This activity is justified from the standpoint of good public health, without regard to civil defense. In the event of an attack followed by the crowding of the people into small living quarters such as barracks, the incidence of disease will increase and conditions will be favorable for epidemics. Immunization will reduce this possibility very materially.

The middle western states have another reason to be concerned about the status of public health measures in this area. It is not unreasonable to expect that in case of an attack on the seaboard states, a sudden large shift in population to the midwestern states will occur. The natural result will be a general lowering of living standards in the area. Inadequate sanitary facilities, crowding, and poor nutrition would contribute toward poor living conditions. This again indicates that an adequate immunization program is good procedure.

Epidemiology and reporting are of vital importance as a part of our civil defense. It is evident that in case of an attack with biological weapons, our first indication that we are under attack may well be the reporting of cases of the disease. It does not seem likely that this means of warfare can be developed to the point where it will be a primary means of attack. It is certainly possible that it may be used on a limited scale as a means of sabotage. In the event this is the case, the means of control which have been used for years by health authorities should be effective in controlling the disease. It will be important to have early reporting, however, in order that the control measures may be placed in operation with the least possible delay. Immediate action will do much to allay public fear. Action must await the reporting and evaluation of the information. Early, complete reporting is therefore highly essential.

Radiation monitoring is an activity which has become necessary with the advent of atomic bombs. It does not appear that radiation will become a means of warfare in itself, but it is a by-product of the use of atomic weapons. Radiation monitoring teams must be trained and equipped as a part of our program. We must be able to give the public information and assurance regarding the possible dangers of radioactivity in or near a bombed area. Monitoring teams will collect information and forward it to a central point. Here, it will be evaluated and if necessary dangerous areas will be guarded or signs will be erected to warn the public. It will be important that the public understands the procedure to be used before an attack occurs since the idea of radioactivity is new in the thinking of the general public. It cannot be detected by the senses and the fear of the unknown can be expected to create a mass hysteria unless the public has confidence in the authorities who are handling this phase of the work. Thus, in this case we must not only educate and train our monitoring teams but we must also educate the general public if the program is to be effective.

In the field of sanitation, for the purpose of civil defense, we will include safe water, food and milk sanitation, waste disposal, garbage disposal, and insect and rodent control. We must resort to education of the general public with respect to most of these things if we are going to maintain the level of sanitation at any reasonable point. In the final analysis, the individual is going to find himself on his own when disaster strikes. He must be taught what to do for himself and his family to provide the maximum protection against illness. In general, the same good sanitation practices which protect us in peacetime will be effective in case of attack. The proper disposal of wastes will become even more important during and after a disaster. The individual must be taught that it is important to bury all wastes immediately so that flies and insects cannot feed upon it or lay their eggs in it. He must be taught that he can make use of the water in his hot water tank or his closet tank for drinking in the event the city mains are destroyed. He must be taught that it may be far more dangerous to use water from an old abandoned well than to use the water above mentioned. This, and a great deal of similar information, must be given to the layman in order that he may take the proper action when the need arises.

It will be necessary for teams to be organized to spray disaster areas for insect control. The individual will have neither the inclina-

tion nor the means with which to do this work. Sanitation and insect control become of great importance after an atomic bombing because the resistance of the individual to disease will be lowered at that time. Exhaustion will make people more susceptible than would ordinarily be the case. In addition, those people who have received excessive doses of radiation become increasingly susceptible to disease because of changes in the blood which lower resistance. It will therefore be essential that facilities providing for emergency housing and feeding be carefully planned to provide for a minimum of crowding and for the best sanitation practices in the preparation and serving of food. Food and menus should be selected carefully, both from the standpoint of good nutrition and from the standpoint of avoiding those foods most commonly associated with food-borne infections. Proper planning can very materially reduce the likelihood of illness among those using the facilities.

Time does not permit a discussion of such services as mortuary, industrial health, and laboratory, but they must be covered in our health services planning. It can readily be seen that health services for civil defense call for the greatest possible expansion of our present public health program. This will certainly take care of many of the needs of civil defense. Time and effort spent on this portion of the civil defense program will pay real dividends in better public health, even though it never becomes necessary to apply it in civil defense. This benefit alone will more than justify the time, effort and money expended on the program.

THE RESPONSIBILITIES AND FACILITIES AVAILABLE IN A PRIVATE NEUROPSYCHIATRIC HOSPITAL TO THE MEDICAL PROFESSION*

By ARTHUR J. SCHWENKENBERG, M.D.
JOSEPH L. KNAPP, M.D.
and
JOHN C. POWELL, JR., M.D.
Dallas, Texas

As a physician associated with a private psychiatric hospital, I consider myself very fortunate to be living and practicing in this day and age rather than even fifty years ago. I feel that I am expressing the sentiments of all physicians in my chosen specialty. The reason for this is that we are able to cure or help a far greater percentage of cases than even a generation ago. In keeping with this satisfaction in being able to help more people our responsibilities and duties to our patients and the rest of the medical profession have greatly increased. A tremendous change has been made in the past fifty years in the attitude of the general public toward neuropsychiatric treatment, and there has been an even greater change in the attitude of the whole medical profession, and particularly the neuropsychiatrists. The day has gone forever when the neuropsychiatrist practicing in a private mental hospital kept himself aloof and in a self-erected ivory tower of isolation in the hospital, or what in those days was frequently referred to as the "crazy house."

The reasons for this radical change are many. First and foremost, in the last few decades tremendous strides have been made in the treatment of the mentally ill, as well as in other forms of illness. There have been many advances in the field of psychoanalysis. Then came the advent of insulin shock; a little later electroshock.

The field of pharmacology has seen the introduction of a whole host of new anticonvulsive drugs in the treatment of convulsive disorders; the use of penicillin in the treatment of central nervous system lues, as well as a number of others which are beneficial in treating various other neuropsychiatric disorders, for example, Parkinson's disease.

The introduction and use of psychosurgery has opened up a tremendous field and broadened the horizon of treatment in neuropsychiatry which as yet has only partially been explored.

There has been the use of the lobotomies: prefrontal lobotomy for the more serious forms of mental disorder which were previously considered not amenable to treatment. Later came the transorbital lobotomy introduced by Walter Freeman, which provides a much simpler and safer procedure for treatment of similar cases of major, as well as minor, psychoses which are not amenable to other forms of treatment. Also there has been the use of both the prefrontal and transorbital

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lobotomy in the relief of intractable pain.

From the diagnostic standpoint there has been the development of many new psychological technics and tests as well as many specific intelligence tests. There has been the development of the numerous forms of personality tests which are being found daily more and more helpful in the diagnosis of difficult neuropsychiatric cases.

There has been the invention and perfection in technic and use of the electroencephalogram in the diagnosis of convulsive disorders, as well as many organic conditions of the brain.

The establishment of new laboratory procedures, the use of the air encephalogram and the arteriogram, all of these diagnostic methods and treatment facilities are available in a private psychiatric hospital. Today the private psychiatric hospital can offer the patient new and more definite diagnostic procedures and also new treatment methods. They have diminished the length of hospitalization. Fifty years ago, the best a private hospital could offer to the patient was a treatment program that took a minimum of from three to six months and offered nothing more in many instances than a slight improvement or indefinite hospitalization. This means that the private mental hospital was almost prohibited to the average patient from a purely economic standpoint. Today the average stay of a patient is six to eight weeks. Let me give to you for example a specific type of mental disorder.

Twenty years ago the average patient with depression, whether involutional or manic depressive, stayed in the hospital under treatment from three to nine months. Today the average hospitalization for the same type of case is four to six weeks.

The next reason for this change in attitude in neuropsychiatric treatment by the private psychiatric hospital is a definite change of concept by the rest of the medical profession. A patient twenty-five years ago referred by a physician to a private neuropsychiatric hospital fell into one of two broad categories.

He was obviously so mentally ill that his family and friends recognized it and demanded of the physician that something be done about the situation to protect not only the patient but his family and the community.

The second broad category is the patient whom the physician had seen and treated and upon whom every possible diagnostic test was made, even including one or more operations, with no apparent improvement. Finally in desperation by a process of long and costly elimination the physician decided the patient fell into the category of psychoneurotic, now more properly called psychosomatic illnesses. The patient and his family were then referred to a private neuropsychiatric hospital.

This is not said in criticism of the rest of the medical profession of that time. Even twenty years ago, little was offered in the medical school curriculum concerning neuropsychiatric illness. When I recall what was taught me as a medical student in neuropsychiatry, I wonder how I ever became interested enough to make it my chosen specialty. The courses which I recall very clearly consisted primarily of a series of lectures on the major psychoses, describing in detail the symptoms and diagnoses with little mention of treatment except the recommendation that the case be referred to neuropsychiatrists for hospitalization. Any mention of treatment was as sterile of any hope of improvement or benefit as that which we are so unfortunately faced with even today in the case of a far advanced inoperable carcinoma.

It was not curative in the treatment approach at all but merely palliative, preferably to be done by someone other than the physician who had the case.

General medical literature was woefully lacking in any article dealing with problems of a neuropsychiatric nature. An article of any aspect of psychosomatic medicine or any definite treatment of any of the major or minor mental illnesses was almost unheard of. The whole situation has fortunately shown a progressive change.

Neuropsychiatry has graduated from a minor subject in the medical school, where a few diagnostic lectures were given based on diagnoses and symptoms, to a recognized and important part of the medical school curriculum. The various aspects of psychosomatic medicine are fully covered in most medical schools today. One can hardly pick up a medical periodical in which there are not found one or more articles upon the various aspects of neuropsychiatry. Too many cases are still re-

ferred to the private psychiatric hospital only after all resources available to the physician have been exhausted, and frequently at the request of the patient and his family.

The third and most important change in attitude and aspect of the private psychiatric hospital is that of the general public, our patients. We have gone through two major wars in the past thirty years with millions of women and men in the armed services. There they were taught that it is not a disgrace to be referred to a neuropsychiatrist for examination and possibly treatment.

Thousands of men and women were hospitalized for neuropsychiatric disorders in the services and received treatment, and their families learned to accept the fact that neuropsychiatric illness was a true illness that could be treated and cured in the majority of instances. Another factor is that there have been hundreds of articles in laymen's magazines and newspapers on neuropsychiatric illnesses, describing in detail, unfortunately in some instances, the form of treatment available for this form of illness. The whole matter of more understanding by the average patient and his family has led to an increase of responsibilities and duties on the part of the rest of the medical profession, which recognizes or recommends hospitalization in a private psychiatric hospital or public mental hospital, before the patient or his family drifts off to a physician who does recognize the nature of the illness.

So far I have discussed the change of attitude toward hospitalization in a private psychiatric hospital by the psychiatrists, the general medical profession and the patient and the public. Now, what are the facilities available in the average private psychiatric hospital today for diagnosis and treatment?

This might well be divided into discussion of the in-patient, or patient who requires hospitalization for diagnosis and treatment; and the out-patient, who because of the nature of his neuropsychiatric disorder is amenable to treatment without entering into the hospital.

First, let us take up the diagnostic facilities and treatment available for the patient entering the hospital.

The building should be either fire-proof or should meet the necessary standards of the fire department, with frequent inspections by the fire department officials available. Adequate facilities preventing, in so far as possible, any act of self-destruction by the patient should be provided. Unless the private hospital accepts only the minor psychosis or psychoneurosis there should be reasonable facilities provided to prevent the very sick mentally ill patient from leaving the hospital without permission of the physician and the family and possibly doing some harm to himself or others. A very adequate and well trained nursing service should be secured. Its personnel should have been carefully selected and trained in this field of nursing and an adequate number of trained graduate neuropsychiatric nurses should be on duty at all times. There should be a sufficient number of trained neuropsychiatrists to provide adequate treatment and full coverage twenty-four hours a day and seven days a week, to be immediately available for any emergency that arises. The hospital should provide well planned meals and see that at all times they are attractively and appetizingly served and, above all, that when they reach the patient they are hot. While the diet is an important phase of treatment in any type of illness, it is even more so in the neuropsychiatric patient who requires hospitalization. A trained person should be in charge of any special diets for the patients with associated physical disorders, such as diabetes, gastric ulcer, or any of the similar conditions requiring a regulated diet. Unfortunately the same patient can be suffering from a frank physical disorder associated with a neuropsychiatric disturbance.

All forms of neuropsychiatric treatment should be available in a private psychiatric hospital, such as psychotherapy, electroshock, insulin shock, fever therapy, carbon dioxide therapy, all administered by highly trained and competent personnel, not only from the physician standpoint but from the nursing standpoint as well.

Complete laboratory facilities should be available in the sanitarium itself, which are under the direction of a trained laboratory technician and a careful laboratory work-up should be done on each patient admitted. The basic and minimum of these tests should and will probably vary, but they should include at least a routine urinalysis, complete

blood count, complete blood serum tests and blood chemical studies, particularly for blood bromide. Either in the private hospital itself or by definite arrangement with some other laboratory in the vicinity, every form of laboratory work, including complete blood chemical analyses, should be available. There should be complete x-ray facilities available, not only for the routine x-rays, such as for determining possible fractures and chest plates, but also for the more technical and specialized form of x-rays required in the practice of neuropsychiatry, such as the air encephalogram and arteriograms.

A trained clinical psychologist should be on the hospital staff and any necessary personality evaluation tests should be given to all patients where there is any indication for them.

There should be a planned recreational and occupational therapy program under the supervision of trained personnel so that this type of treatment may be available for all patients.

In respect to the out-patient diagnosis or treatment provided by the private neuropsychiatric hospital, this is a field in which in many instances the private hospital has fallen down. The private neuropsychiatric hospital should have full diagnostic and treatment facilities for all patients referred to it and furnish this service not only to the general practitioner and all of the other specialties of medicine, but also to the neuropsychiatrists in the area doing private practice. They should have all available facilities, including equipment such as muscle-testing for all neurological patients referred for consultation.

Full psychological testing and evaluation facilities should be available, given by a trained clinical psychologist for doing any type of intelligence test, as well as the multitude of now acceptable forms of personality evaluations, such as the Rorschach, the Minnesota-multiphasic, or others, that may be requested by the referring physician. It is usually not possible for the physician doing private practice in neuropsychiatry to have available in his office such facilities. There should be complete laboratory facilities available to all out-patients, including the usual laboratory tests. It should be possible to send an out-patient into the hospital for spinal fluid examination or any specialized x-ray facilities, such as skull x-rays and in some instances even air encephalograms. Facilities for electroencephalographs should be available so that any patient referred by the private physician, whether he be a neuropsychiatrist or in general practice, can be referred to the sanitarium for a complete work-up and the necessary specialized tests done in the field of convulsive disorders. It should be the aim and principle of the neuropsychiatric hospital to try to treat as many patients as possible referred to it on an out-patient basis with any recognized and acceptable form of treatment.

These forms of diagnosis and treatment include psychotherapy, electroshock therapy, administering of carbon dioxide treatment, or any other procedure that can safely and effectively be done on an out-patient basis. Electroshock therapy should be available for all patients under the treatment of the private neuropsychiatrist in the vicinity. The neuropsychiatric treatment should be under the direction of the referring psychiatrist with the hospital administering treatment according to his recommendations.

Several neuropsychiatrists in the Dallas area refer all of their patients requiring electroshock treatment on an out-patient basis to our sanitarium, because they have found it more efficient and time-saving on their part, as well as much more satisfactory to both the patient and his family.

With the various forms of diagnosis and treatment offered and available in the private neuropsychiatric hospital to both in-patients and out-patients, there are also added responsibilities. The hospital should make every effort to see that any patient referred for hospitalization is admitted as quickly as possible and should always be in a position to accept any psychiatric emergency cases. The relationship between the referring physician and the patient and his family should always be maintained and upon discharge the referring physician should expect to have the patient referred back to him. The physician should at all times be fully informed as to the diagnosis, the form of treatment, and the progress of the patient under the treatment, by a series of letters while the patient is in the hospital. Upon discharge, the referring physician should be given a short summary of the patient's condition and course in the hospital and any

recommendations made to the patient and the family. The family, likewise, should be kept fully informed as to the patient's condition and progress at all times by frequent letters and sometimes phone calls and also formal conversations with the members of the family.

The hospital should have a full consultation staff in all the various specialties of medicine, including dentistry, so that the patient can be referred to specialists for consultation in any other fields of medicine while in the hospital. Not only should this consultation staff be available, it should be used; so that the referring physician can feel sure that nothing is overlooked from a purely physical as well as from a neuropsychiatric standpoint.

In respect to out-patients referred to the sanitarium for diagnosis and treatment, in all instances the referring physician should continue periodically seeing the patient while he is under out-patient treatment. The neuropsychiatrist who refers a case for diagnostic procedure and treatment, such as electroshock therapy, should be promptly notified of the results of any diagnostic procedure and in the case of electroshock, the patient and the family should be constantly reminded that the entire treatment is under the direction of the private physician.

In summary, we wish to point out several points. First, there has been a change of attitude towards the neuropsychiatric hospital by the hospital itself, by the rest of the medical profession, the general public, and the last, but not least, the neuropsychiatrists in the private psychiatric hospital, with a better understanding as to the diagnostic and treatment facilities available to the patient. With the adjunct of many forms of treatment procedures and technics, persons who are suffering from a mental illness, an organic neurological illness or a frank psychosis can be treated and helped or cured in a reasonable period of time. The out-patient diagnostic and treatment facilities provide a means of both diagnosis and treatment for all patients referred by the general practitioner or the various other specialists or the neuropsychiatrists in private practice. Many of these forms of diagnosis and treatment would not be possible or feasible to provide in any other way.

In conclusion, the private psychiatric hospital today is an institution where any physician can refer his patients for neuropsychiatric evaluation, diagnosis, and treatment on either an out-patient or an in-patient basis and still retain his relationship with both the patient and his family.

DISCUSSION *(Abstract)*

Dr. Howard R. Masters, Richmond, Va.—Private neuropsychiatric hospital service has become a broadened field in medicine. The patient no longer comes into the hospital to receive a "fruit jar on the shelf" type of diagnosis, and be forgotten, but is studied from every medical, neurological, and psychiatric angle, and any specialty viewpoint indicated. Physical diseases are treated either before or concurrently with the psychiatric treatment. All hazards are eliminated as far as possible. When all diagnostic data is in, the case is staffed and appropriate treatment is discussed. More personal time can be given the patient in a private hospital.

We have available to psychiatrists and neurologists, electro-encephalographic and laboratory service and also the service of a psychologist. In addition, many practitioners and referring physicians have come to recognize the value of telephone consultation in which suggestions as to the management of their patients in the home are given or suggestions in the preparation of a patient for hospital admission.

The private neuropsychiatric hospital now participates in community mental hygiene programs, giving discussions before various interested groups of laymen and often at the staff meetings of general hospitals.

Harris, Bennett and Ebaugh are strong advocates of psychiatric wards in general hospitals because of the availability of other medical and surgical services. We have never found that a private psychiatric hospital has suffered any lack of consultation on operating room service when located in or adjacent to a city. When transfer for surgical service is indicated, it can easily be accomplished.

The National Association of Private Psychiatric Hospitals is doing a good job with its members (about one hundred) through its standing committees on research, standards and other related committees, and through round table discussions of hospital and treatment problems at various meetings.

Another service of value to business firms and other organizations is that of personality and qualification appraisal as related to employment. More and more business firms are using this method of employment.

I doubt that any other branch of medicine makes any more detailed and thorough study of the patient than does psychiatry.

Treatment is much more thorough and flexible with a greater rate of improvement. Frequent appraisals of results in various groups also enable us to modify and improve treatment. I personally feel that we should not wait so long in the application of psychosurgery.

Dr. Leslie B. Hohman, Durham, N. C.—It would seem to me that the development of all of the special technics needed in psychiatry today such as electroencephalography, electrocardiography, pneumoencephalography, ventriculography, and lobotomy could with difficulty be carried on in a private neuropsychiatric hospital unless it were an institution of very great size.

It would be difficult to find men of high competence for these very special technics, including trained neurosurgical teams, outside the staff of a general hospital. This statement is not intended to minimize the importance of the good works done by the private psychiatric institutions but to point out the necessity of the active cooperation of a good general hospital where technical experts are available.

THE HOSPITAL'S TRAINING PROGRAM IN RELATION TO THE MEDICAL SCHOOL*

By B. I. BURNS, M.D.†
Kansas City, Missouri

It is not the purpose of this paper to attempt to describe nor to promote a definite type of training program for residents, interns, nor other hospital personnel. Rather, it is intended to call attention to some problems related to this training in which hospitals and medical schools have a mutual interest. At least they are of basic concern to the hospital in which your graduates serve as interns and residents, and I feel that they have not often been recognized as a responsibility of the medical faculty because the hospital administration has failed to call its attention to them.

Hospital problems may be considered under three major headings: (a) maintenance of efficient, progressively improving quality of medical care; (b) support of a training program for all categories of personnel, particularly doctors, nurses, technologists, social workers, and physiotherapists; (c) the accomplishment of these two functions within the budget limits imposed by conditions beyond our control.

These three problems are too interdependent in the framework of the hospital administration to permit of isolated discussion of them. Teaching and patient care go hand in hand and determine cost of hospital operation, which has been steadily mounting for the past decade and continues to mount.

At the risk of being considered trite it seems necessary, in order to round out the discussion, to offer a brief outline of the function of a hospital administration. Doctors sometimes seem to gain the impression that the hospital administrative organization is designed chiefly for the purpose of badgering the medical staff. At times, because of the necessity for conforming to definite procedures which are an essential part of hospital operation, the hospital administration is forced into a position of being accused of interfering with what the physician considers the best interest of his patients.

The hospital organization that is not constructed and operated upon the premise that it exists for the fundamental purpose of providing for its medical staff the very best support of patient care that its facilities and the ability of its personnel will permit, soon finds itself floundering in the ruins of the institution it was responsible for guiding. The hospital administration cannot function effectively, however, without the understanding cooperation of its medical staff as a part of the organization. It has been my fortune in hospital and medical school administration always to have been associated with a medical staff on which the majority of doctors, when reasonable explanations for procedures and regulations were offered them, were sympathetically cooperative. Nevertheless, it is too often evident that young staff men are learning how to fit into and make the best use of the hospital organization the hard way. Interns and even residents frequently express their incomplete understanding of many hospital regulatory procedures and the justification for them. Therein lies the need for better cooperation between the medical school and the hospital in the training program for doctors.

The foregoing is not intended to present a case for formal training of medical students in hospital administration but to suggest that, incidental to his clerkship on the wards of the medical-school-affiliated hospital, some special steps be taken to inform the student as to the

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†Commissioner of Hospitals, Kansas City, Missouri.

best means of securing the help the doctor needs for hospital care of his patient.

Whether the student is headed for general practice or for practice in one of the special fields, from the moment he enters the medical school his instruction is specialized and his consideration of patients individualized. The doctor, by training and of necessity, is single-minded to the consideration of the condition presented by the patient before him. Neither by virtue of his training nor professional interest can he be expected to analyze the machinery through which the help he needs to have immediately at hand is made available. He may become understandably disconcerted unless the hospital administrator makes it his business to see that personnel and other problems are explained to him. Procedure difficulties frequently arise between individuals which are not the fault of either but for which each may unthinkingly hold the other responsible. The fault lies in the failure of the hospital and medical school administration to instill in all personnel a clear understanding not only of how hospital personnel is organized and how its organization functions, but why its activity must be in accord with definite lines of authority and responsibility.

Lack of confidence between the hospital administration and its medical staff is not uncommon if the frequency with which the subject is brought up in hospital administrative conferences is a criterion. Incompetence of the administration or the medical staff or both may occasionally be the explanation. Almost always, however, the answer is to be found in failure of the two divisions of the organization to understand each others' problems. Increased supervision of the medical student's contact with the administration of the school's affiliated hospital would do much to ready him for happier and more effective experiences in a type of organization in which a great deal of his professional life will be spent.

The impression should not be left here that the medical staff is the only part of the hospital organization in need of better conditioning. Some divisions of hospital personnel are ordinarily well schooled in the relationship between individual and group responsibilities. In most of them, on-the-job training and more or less regimentation type discipline is maintained for efficient functioning. The medical staff cannot be subjected to this type of performance. Its professional activity calls for directing and utilizing the organization. Certain examples of the advantages to the medical staff of its understanding use of a well organized hospital administration may be indicated.

The largest department in the hospital organization from the standpoint of personnel and the administrative responsibility assigned to it is the nursing service. It is also between the nursing service and the medical staff that misunderstandings most frequently arise which call for attention from the administrator. Many of these misunderstandings result from conflicts of personalities such as occur in other types of activity. The great majority, however, stem from failure of the nurse to understand the doctor's problem or the doctor to appreciate the administrative problems of the nursing service.

This division of the hospital's activities is, as a rule, the one which operates most definitely in accord with well-established procedures and regulations. This is necessarily true for several reasons. The nursing service is the only one that is represented on the hospital ward at all times. This fact and the nature of the nurse's training lead to placement on the nursing service of much of the responsibility for activities which must be meticulously performed in the management of patient care. The nurse's responsibility and authority are carefully spelled out in a properly organized service in order to make it possible for her to accomplish her task and to avoid conflicts with other services, including the medical staff. In no other division of the hospital organization is administration taught as systematically as in the training of nurses.

Not infrequently, however, the nurse's refusal to deviate from the lines which have been established for her in her training and by administrative regulations lead to the very conflicts which her instructions are intended to avoid. When this happens it is usually because of lack of understanding on the part of someone else. It is undoubtedly true that a director of nursing service is always in the position of enforcing regulations and procedures with which she is not entirely in accord, but which are imposed by the hospital ad-

ministration or the agency responsible for accreditation of the nursing school or nursing service.

For reasons that are usually apparent, but sometimes not, many responsibilities are placed on the nursing service that more properly belong elsewhere. Examples of this are numerous. They would include many clerical duties, housekeeping chores, and contributions to management of laboratory and x-ray services. These are hospital administrative faults against which both the nursing service and medical staff might justifiably rebel. Often the faults are well known to the administration and impossible to correct because of budget and other limitations.

Many problems of patient care relate to failure of the medical staff to understand how to make use of medical social service workers. Although this professional group is generally recognized as an essential part of a teaching hospital organization, it is surprising that many doctors have failed to become cognizant of its actual functions. Quite commonly they consider them to be limited to hospital admissions procedures. This deficiency in training of the profession must be laid to the medical school.

In most school-affiliated hospitals there is an active social service department and some of the clinical staff on the faculty of the school do use the social worker to great advantage for such aids as evaluating home conditions which may have a bearing on convalescence, obtaining needed assistance from outside agencies for medicines and food, home nursing care, and in many other ways.

Medical school efforts to indoctrinate undergraduate students in the meaning of social work and the methods of utilizing it have not been very successful. The reason is partially understandable. Usually the effort consists in scheduling a few lectures by a social worker, usually a woman. For some reason medical students do not, as a rule, take well to being lectured to by women, however capable and conscientious they may be. Moreover, instruction by a member of the medical faculty based on his experiences has a clearer ring.

The didactic program should consist chiefly of lectures by a doctor who understands the place of the social worker in the medical team, if lectures are needed at all. A better program would consist of demonstration of the help expected from the social worker by having her accompany the doctor on rounds with his nurse, medical staff, and student group. If the social worker is to be included in the medical team with the doctor and the nurse, she should receive instruction from the doctor as to what help he expects from her to aid him in the care of the individual patient. The student should be in position to hear these instructions given and should be led to understand the results expected from this service.

The opportunity to observe the use of the service and to hear the social worker analyze the social problems of the patient in conference and clinic under the guidance, direction, and questioning of the doctor is, in my opinion, the only effective method of training the medical student in the function of medical social service. Whatever the method of training in this regard, certainly the medical staff must come to accept and utilize the social worker if the hospital is to continue to support this service. And a teaching hospital cannot operate without it. A threat to abolish it will be met with strenuous objections from a considerable portion of the staff membership, yet the service is not effective because of inadequate training of the medical profession as to its place in the patient-care program.

The medical school faculty and administrator need to give more attention to hospital cost of operation in the training of medical students. The hospital administration is at the mercy of its medical staff with respect to cost of such patient-care items as drugs, laboratory, and x-ray. It should be a definite responsibility of the medical faculty to train its students to be able to order these supplies and procedures with every possible regard for cost without detracting from effective patient care. Medical economics is recommended by many authorities for a place in the medical school curriculum. A well-planned analysis of factors influencing cost of patient care including exposition of means by which the physician can contribute to control of hospital costs would be a sound contribution to the student's training.

In line with other items determining cost of hospital operations are those related to the

prescription of pharmaceuticals which may easily become a terrifying hazard to the hospital's budget or to the patient's finances, depending on whether the cost of medication is levied against the charity hospital budget or against the private patient. In either case the hospital administration is credited with the high cost. Stimulation of the future doctor to analyze the content of proprietary preparations and improved instruction in practical pharmacology to enable him to do so would go a long way toward correcting a difficulty that plagues the hospital pharmacy.

The pharmaceutical houses have made many noteworthy contributions to the progress of medicine and the profession has reason to be everlastingly grateful to them. The statement that the medical profession of today relies on the representatives of the pharmaceutical houses for its instruction in practical pharmacology is heard from doctors and detail men alike. The situation is deplored by clear thinking men in both groups. Surely, in this chemical age of medicine, the medical faculty, through better teaching in practical pharmacology, can and should come to the rescue of the hospital administration in the effort to operate its pharmacy more intelligently and economically.

Certainly the detail man's information may be expected to reflect his zeal for promoting his firm's product. The hospital pharmacist is forced to substitute in filling prescriptions or to stock many almost identical formulae under different trade names. The former gets him into trouble with the doctor who may insist on his own favorite proprietary brand although all are manufactured in accord with the same formula and under the same government regulations. The latter breaks the bank.

The laboratory and the x-ray department present similar cost problems to those of the pharmacy. The answer is not in denial by the hospital administration of examinations which the doctor indicates he needs for the care of the patient. Again the clinical teaching in the medical school could help by manifestation of greater concern for cost of medical care in the instruction of students. If for no other purpose than stimulating the student to make full use of his wits before calling for help from the laboratory or x-ray service, greater insistence on formation of the habit of putting first things first would seem to be justified. Certainly it would eliminate great waste in supplies and in personnel time.

I am familiar with the pedagogical attitude which advocates permitting the student to find his own way and that he must have an opportunity to learn by trial and error. On this theory he should be free to proceed according to the dictates of his judgment and teach himself that his judgment needs revision. Another and less expensive method is to permit him to make his decisions and lead him to correct them through discussion of the case under consideration before setting too much hospital machinery into operation to execute his requests for laboratory and x-ray procedures. If this sort of instruction is not given him as an undergraduate, the pathologist and the radiologist must give it to him as an intern. Such supervision of a hospital activity is awkward and leads to payment of a high price for lack of medical school training in methodical thinking.

An effort has been made to point up some of the seemingly trivial defects in our training programs for which the medical school and the hospital have a mutual responsibility. The suggestions do not call for revision of any curriculum but for application to it of incidental attention to practical administrative relationships of medical management to hospital organization. The hospital staff is interested in promoting a progressively improved training program because that improvement is the way to better medical care. At the same time, it is realized that something must be done to limit the cost of good hospital care of patients unless the medical profession is to face the necessity of taking more and more of its practice back into the home and the office. The medical school and the hospital have the same objective. We have a good mutual understanding of the major problems incident to reaching the objective, but we need to give some thought and effort to minor ones before they grow out of bounds.

Three developments in our training programs during the past decade demand special attention of all institutions offering training at the student, intern, or resident level. They are: (a) increased capability of medical graduates to assume responsibility for medical

care; (b) the recognition of general practice training; and (c) the large number of residents being trained in the specialties. Each of these developments influences the hospital training program and calls for modifications which should be guided by medical school leadership.

The provision in the undergraduate curriculum for clerkships in the hospital during the junior and senior undergraduate years has resulted in sending to the hospital internship graduates who are better qualified to practice medicine than were most individuals at the completion of the internship a few years ago. The intern's activity can no longer be limited to such routines as history taking, physical examinations, and similar assignments if his year of hospital experience is to represent a year's progress toward professional qualification. Supervision of his activity should not be relaxed but it should permit him to participate more extensively in those activities in which facility can only be acquired by performance. He is preparing to enter general practice or specialty training and must be given the opportunity to acquire the skills necessary to do so. At least some medical schools are meeting with some difficulty in recruiting interns for their own hospitals from their own graduating classes because the service offered is regarded as little more than a continuation of the clerkship. Most private hospitals have the same difficulty for the same reason.

The placement of the general practice trainee in a hospital training curriculum designed for rotary internships and specialty residencies poses somewhat of a problem. It will soon become necessary for hospitals training a large number of residents to decide on the ratio of general practice opportunities to those for specialists. The training of general practitioners does not call for revision of the undergraduate curriculum, but, if a hospital now offering specialty training to a considerable number of residents is to train a substantial number of general practitioners, its entire program beyond the rotary internship, at least, must be modified administratively. In many instances some reorganization of the visiting staff will also be necessary. In this development a vigorous indoctrination of medical students and staff under the leadership of medical faculties will be necessary if a satisfactory program is to be evolved.

Hospitals profess to maintain training programs for specialists primarily as a contribution to medical education; patient care is ostensibly incidental. The fact is that operation of a large charity hospital without such a training program would be practically impossible and, if effected at all, would result in great sacrifice of standards of patient care or employment of a paid visiting staff at salaries which would add tremendously to an already staggering hospital cost. Yet we must face the fact that unless the number of specialists now being produced is curtailed, a great percentage of them cannot be absorbed in medical practice. If more general practitioners and fewer specialists is the over-all answer to the need for more doctors, then fewer specialty residents and more general practice residents must provide the house staff we need to operate our charity teaching hospitals.

The more efficient use we make of the resources we now have and are to have in the future, the more of the good in our present-day method of practicing medicine we shall be able to preserve. The greatest threat to continued high quality medical care in our nation today is related to the increasing cost of it. The only safeguard against this and all lesser threats is to analyze our operations from start to finish and establish closer cooperation among all agencies concerned with providing medical care than has ever been effected to date. The means of maintaining our present high standards of medical training and medical practice are not to be found in centralized control through more and better bureaucracies, but in our own application of greater and more intelligent effort toward improving practical training and patient care at the level on which they are actively carried out.

DISCUSSION *(Abstract)*

Dr. John C. Mackenzie, New Orleans, La.—Any hospital appointing interns to its staff has a very direct and definite responsibility to provide training, and set up a training program for them. This can be accomplished only if the medical staff will give wholehearted support. This support means not only the taking over of certain lecture assignments in a formalized teaching program, but more important is that

the medical staff exercise a close supervision over the intern in seeing that case histories are properly completed, and are full and adequate, particular stress being laid on the importance of a complete history as regards personal, family, and present complaint.

An exhaustive history will go far towards arriving at an adequate diagnosis which can then be confirmed by laboratory investigation. It is essential that the intern be impressed with the importance of the case history since a number of them will go into general practice in rural areas where the advantages of laboratory procedures readily available in the large hospitals will not be at hand.

Dr. Burns also mentioned the use of ward secretaries in order to relieve the nursing services. From our own experience we would say that this is not only desirable, but today with the ever-present shortage of nursing staff is essential. We use our ward secretaries not only to fill in requisitions, time schedules required for the nursing office, certain aspects of charting, and so on, but also to control visitors and supervise other nonprofessional help on the wards such as dietary and housekeeping maids. In other words, the secretary more nearly approaches the ward executive assistant rather than confining her duties to secretary.

HAY FEVER*

SOME REMARKS CONCERNING DIAGNOSIS AND TREATMENT

By WILLIAM D. GILL, M.D.†
San Antonio, Texas

The diagnosis of nasal allergy or hay fever does not ordinarily present a difficult problem. Objectively the swollen, edematous and pale appearance of the nasal mucosa, associated with an excess of mucoid secretion is enough to cause one strongly to suspect the true nature of the patient's ailment. In hay fever the nasal secretion when stained and examined microscopically is found to contain large numbers of eosinophils. With the advent of infection, the picture changes by the appearance of large numbers of polymorphonuclear neutrophils in the secretion. When infection is engrafted upon an allergy the nasal mucosa may assume a hyperemic, red appearance. Mistakes in the diagnosis of suppurative paranasal sinus disease are surprisingly frequent, due to the fact that in a high percentage of cases sinus disease represents a pre-existing allergy. Failure of sinus patients to respond to treatment can quite often be traced to the fact that the underlying allergy has been overlooked or disregarded. The nasal septum is a far more reliable guide to both infections and allergy than any other objective finding. In allergic noses the septum is pale; in infections it is red. This rule is not absolute, for where infection is engrafted upon allergy the appearance of the septum may be misleading. We prefer to estimate the number of eosinophils in the nasal discharge on a percentage basis, for it has been found that when this is done a fairly reliable guide to treatment is provided. When the eosinophil count drops to ten per cent or less the patient has usually reached a stage in which he is comfortable or symptom-free. A percentage count of eosinophils may be facilitated by inserting a disc of stiff paper in the eyepiece or ocular of the microscope in which a one-centimeter square window has been cut. This will assist greatly in counting the cells and arriving at a percentage count. A graphic chart can be plotted from day to day which serves as a fairly accurate index of the patient's response to treatment. A total of one hundred cells offers the best basis on which to compute a percentage count, but there are times when we must be content with as low a count as twenty-five cells. The presence of eosinophilic granules in the cell is considered necessary by authorities on the subject before the cell is classified as an eosinophil.

Skin tests are sometimes of great value in determining the allergen responsible for hay fever, but such tests are not completely reliable and other factors must be present to establish the diagnosis of nasal allergy. The scratch method is preferred over the intradermal injection of antigens for testing because of the easier application and relatively less danger. Group testing with antigens is performed whenever practicable. Intradermal injections will sometime give positive reactions when the scratch test has been negative, but this method is reserved for questionable cases.

Hay fever has always presented a problem from the therapeutic standpoint. Treatment in the past has been largely unsatisfactory. Many methods of treatment have been used with more or less indifferent results. At present specific desensitization is the treatment in vogue. By this method an attempt is made to

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†Dr. Gill died May 24, 1952.

raise the patient's resistance to the responsible allergen by giving repeated small doses of the offending substance, gradually increasing until the patient's tolerance is increased and symptoms are alleviated. This is an uncertain and slow method which is fraught with disappointment. Even after a large number of antigen injections a patient may still retain a positive skin test, or have symptoms when brought in contact with heavy doses of the responsible antigen.

Prompt relief is desired by the patient suffering from hay fever and can be obtained by pursuing the following outline. The first step in treating an allergic rhinitis is to open the nose by the use of some type of shrinking anesthetic solution to provide the much desired nasal respiration and at the same time furnish an exit for retained secretions. Our personal preference for shrinking the nose is 0.5 per cent ephedrine to which is added 20 minims of 2 per cent solution of pontocaine® to the ounce. This is followed by application of a 4 per cent cocaine in a solution of epinine® (1.00), to the areas that persist in remaining swollen. A few physicians still use a weak epinephrine solution usually combined with an anesthetic to obtain shrinking of the nasal mucosa, although an appreciable number of patients develop histamine-like reactions in the nose following its use, which may be more uncomfortable than the original condition. The admixture of an anesthetic is desirable to overcome the burning sensation present in the nose of most hay fever patients. Especial care is taken to anesthetize the area of the sphenopalatine ganglia. The nose is then gently irrigated with a mildly alkaline solution using a bulb type continuous flow syringe and water at body temperature or slightly above. A mixture of chemically pure sodium chloride with equal parts of bicarbonate of soda is used in the solution to the extent of a half teaspoonful of the mixture to a quart of water. When the nose is clear and all contaminants have been removed from the surface of the mucosa a bland oil is lightly sprayed into the nose. This provides a substitute for the mucous blanket that has been removed by irrigation and also acts to trap pollen granules that may be subsequently inhaled and lodge on the mucosa, the oily blanket preventing absorption. There is no hesitancy in using oil sprays in the nose as there have been no instances in which difficulties have been experienced. In 1929 and 1930 Hajos,[1] Carupi[2], and Sucher[3] called attention to the beneficial effect which followed the use of parathyroid extract in vasomotor rhinitis, angioneurotic edema and in other clinical anaphylactic and allergic disorders. Apparently, this observation was unheeded by the medical profession in general as the drug did not come into general use. The fact remains that marked clinical improvement follows the use of parathyroid extract hypodermically in hay fever, and satisfactory improvement, oftentimes spectacular, follows. The average dose is 0.5 cc. daily, in severe cases a larger dose may be used, 1 cc. being the usual amount. In children a smaller dose is given, usually 0.25 cc. Parathyroid is the pacemaker in calcium metabolism, presiding over the passage of electrolytes through the membranes forming the cell wall thus affecting its permeability and thus overcoming water logging of the tissues. Its presence is apparently necessary before the circulating calcium can be utilized by the body cells. Parathyroid extract has been the most satisfactory one agent that we have employed for the allergic patient. We have used it for over fifteen years with spectacular success, better than 75 per cent of patients so treated obtaining prompt relief. Sometimes a single injection will give complete relief within 24 hours; in others a longer time is necessary. The dosage is repeated every 24 hours and continued until the nose appears normal or until clinical relief has been obtained. This may require ten or more injections. We have had no untoward constitutional reactions in any of our patients. A local area of redness quite often follows in a few hours at the point of injection but this subsides in 24 to 48 hours, leaving no residual abnormal appearance. In seasonal hay fever the subsequent attacks require, as a general rule, much less treatment with parathyroid extract and the patient will usually experience a complete abscence of symptoms after undergoing treatment for two consecutive seasons. By using parathyroid therapy in advance of an anticipated attack it may be forestalled. In addition, intravenous calcium levulinate or gluconate, 1 gram or 15 grains is usually advisable on the initial visit in all severe cases. It may be repeated at 24-hour intervals if necessary. Usually three or four doses is all that is required of this drug. In addition, calcium and parathyroid tablets

are given by mouth to maintain blood concentration of calcium.

Inasmuch as hay fever theoretically represents an imbalance in the function of the autonomic nervous system, with over action of the parasympathetic component, an attempt is made to restore normal balance by giving a prescription containing 1/3 grain of codeine phosphate with 1/3 grain of luminol® mixed with lactose. Usually 12 doses are prescribed and it is seldom that this number of doses must be exceeded. It is used every four hours. This combination works as well or better than the newer antihistamines in our hands. The antihistamines have not proven to be entirely satisfactory in the treatment of hay fever, as they lack specificity in the majority of instances and side effects are too frequent to make their routine use advisable.

Specific desensitization, hyposensitization or immunization can be carried out in conjunction with the above treatment if desired. The effect is slow and not always satisfactory. All too often this type of treatment is based on positive skin tests which may represent false reactions or be "the tombstone of a dead allergy," and of no diagnostic value. Treatment based upon such misleading information can only be unsatisfactory. Even after giving a course of antigens or allergens, skin tests may persist in being positive and exposure to massive doses of the offending agent may give a clinical reaction.

We may further serve our allergic (hay fever) patients by having them avoid air-borne agents such as pollens by living in a pollen free (air conditioned) environment, avoiding contactants and eliminating offending foods from the diet. Observing a certain type of diet which has been referred to as the biologic diet, has certain definite advantages.

In the biologic diet as we ordinarily employ it, five changes are made in the foods consumed. Nothing is eliminated which is not replaced with something equally acceptable to the patient. All wheat products are eliminated from the diet and substitutes made from corn, rye, oats, soy bean or potato are allowed. Pure rye bread is as acceptable to most patients as wheat bread. Cane and beet sugar are eliminated and honey or saccharin is used for sweetening. In this respect the recently developed sucaryl is also satisfactory. Honey is particularly valuable for sweetening as it contains enzymes which are lipolytic, proteolytic and saccharolytic, and the sugar contained in it is an invert sugar, which does not require pancreatic action, or work on the part of the liver to break down the sugar molecule. Pollens are also present. Honey which is indigenous to the patient's place of residence is preferred to an imported product. A time honored treatment for hay fever is to use honey in the diet. Some individuals may be so sensitive to some of the elements contained in honey that only small amounts can be ingested without the production of nausea and intestinal cramps. In such persons we must proceed with caution and allow only minimum amounts in the beginning of treatment.

Muscle meats are eliminated and internal organs substituted for protein requirements. Thus instead of beef steak and chops; kidney, liver, sweetbreads, tongue and brains are used. In addition certain of them provide elements which are desirable, such as riboflavin, as well as meeting all protein requirements.

Milk is eliminated and soy bean milk substituted. If milk is insisted upon by the patient, it may be rendered less allergenic by boiling 15 minutes over an open flame, after which it may be rechilled and used. The use of milk in cooking is permitted. In children, withholding milk may present quite a problem. There are instances in which we must be content with boiling the milk and limiting the intake.

All citrus fruits, including pineapple, are eliminated as the citric acid found in them blocks the oxidation of carbohydrates at the gluconic acid level which stimulates the formation of mucus. Instead the vitamin C requirements are supplied by vegetables or given in tablet form as supplemental therapy. This diet will eliminate 85 per cent of foods to which persons are sensitive, but we must always bear in mind the fact that there may be included in the list one or more foods to which the patient is specifically hypersensitive. When such food is suspected we can check on it with a scratch test. If found to be positive the patient simply avoids that food.

Supplemental vitamin therapy is advisable, especially the use of vitamins C and D.

CONCLUSION

In the treatment of hay fever the use of shrinking nasal applications, irrigation and

hypodermic administration of parathyroid extract and intravenous use of calcium gluconate, plus mild sedation and the use of the so-called biologic diet have proven satisfactory.

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THE LIFE CYCLE OF THE ALLERGIC INDIVIDUAL*

By CARROLL M. POUNDERS, M.D., F.A.C.P.†
Oklahoma City, Oklahoma

This paper is an attempt to point out some of the peculiarities and problems in the life of a certain type of patient with the hope that he might be better understood and treated. Its aim is to give only a working idea and not a detailed analysis of the situation.

The story of this individual must begin with his parents. In all probability one or both of them have bequeathed to him peculiar types of body cells that make abnormal responses to contact with substances which should ordinarily be harmless. These substances are known as allergens and the troublesome antibodies formed by the body cells are called reagins. Heredity cannot be proven in all cases, of course, but there is a strong tendency for this type of cell to be handed down, according to the laws of Mendel. These abnormally reacting cells make up the structure of this individual's tissues throughout his life and constitute the source of many of his troubles. Also, there seems to be some lack of stability of the autonomic nervous system.

These things cause no peculiar problems at birth except where there is a variation in the Rh factor, opening up the possibility of erythroblastosis. Observations tend to bear out the belief that, regardless of Rh incompatibilities erythroblastosis does not occur unless there is present this tendency to abnormal reaction on the part of the body cells.

Although the individual may, from the very time of his birth, show evidence that he has developed reagins against certain allergens, usually a period of ten days to two weeks or more is required for these to develop. Then the maximum point of contact between the allergen (food in this instance) and reagin seems to be in the tissues of the digestive tract. The result is that great disturber of the peace and equanimity of parents, grandparents and physicians, called colic. The general aspects of this condition fit so well into the picture of allergic disturbances as to leave little doubt in the minds of most of us as to its nature and the arguments of those who oppose this view are altogether unconvincing. If left to its own devices it lasts from three to six months or longer and then becomes quiescent. The usual management has been to make frequent changes in the formula, with temporary improvement following each change, but with a reversion to the previous condition in a few days. The over-activity of the intestine may result only in colicky pain or it may be accompanied by vomiting and diarrhea.

With the passing of a few weeks or months the scene of the disturbance may shift to the skin where the reagins accumulate and make contact with allergens, either brought here through the circulation or from outside, or both. Then we have infantile eczema which lasts several months and most often clears up during the second year. Unless the situation is understood from the beginning and proper changes or rotation of formula are carried out, the baby must go through with much discomfort and cause the parents considerable worry and distress.

These manifestations represent the earliest abnormal reactions of the individual's body cells and indicate that they and their successors are capable of continuing some sort of disturbing reactions from time to time throughout the remainder of his lifetime. The physician who has intimate dealings with such cases and has the opportunity to follow them through the years will be impressed by the definite allergic pattern and will be unimpressed by those who speak of such things as maternal rejection as being an etiological factor.

For the most part these infantile disturbances have disappeared by the end of the second year, but some of them continue beyond this time and new ones develop. In the food sensitive child, even after his colic and eczema are over, sufficient reaction still takes

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†Professor of Pediatrics, University of Oklahoma School of Medicine, Oklahoma City, Oklahoma.

place somewhere to prevent him from relaxing into sound childhood sleep for any length of time. He robs the parents of their rest by frequently disturbing them during the night. He responds to such sedatives as the barbiturates very poorly or not at all. Another common symptom noted by the mother is due to itching of the auditory canal and causes the child to rub the ears or dig into them as if they were causing pain. His respiratory mucous membranes have in due time had sufficient contact with such things as house dust, feather dust, fungi, animal danders and tobacco smoke to set up a reaction to them. The harassed physician begins to hear the mother's complaint that in spite of meticulous care, including the giving of all sorts of vitamins, the child has one cold right after another or these may be continuous throughout the winter. Due to the unstable autonomic nervous system these children often sweat profusely during sleep and this is thought to have much to do with the frequent colds. During the earlier years his summers may be fairly comfortable since his respiratory mucous membranes have not yet had contact with sufficient amounts of pollen granules to develop a reaction.

Pollen sensitivity may develop during the first year, but it does not often show up until after this time and does not reach a high degree of incidence until around early school age when more time is spent out of doors and the child ranges greater distances in the open spaces. Increased automobile travel is doing its part to hasten this process by whisking the individual through space and multiplying the number of granules contacted in a given time.

It is apt to be said of an allergic child that he is nervous because the usual dynamic activity of early years is exaggerated in him and he possesses a tremendous energy drive. He never seems to want to let up, puts up a strong resistance against his daily nap and against going to bed at night. His allergic reactions seem to produce some feeling of insecurity and he develops a type of personality which is fairly well described if we apply the prefix "hyper" to practically all his reactions and activities. The average child commonly develops certain fears and resentments toward office procedures such as being undressed, weighed, temperature taking, physical examinations and inoculations. Such fears develop in these individuals to such an exaggerated extent that it becomes no easy problem to subject them to many of the ordinary simple procedures. At such times as they are in a state of allergic imbalance they may be uncooperative and antisocial almost to the extent of being maniacal. It is important that such behavior problems be understood, not only by the parents, but by teachers and all other persons to whom the care of such children is entrusted since, without this knowledge, attempts at discipline may produce anything but desirable results. Only when they reach an older and more reasoning age are they able to overcome much of this; but certain sharp dislikes and fears are apt to continue with them throughout childhood.

Some degree of feeling insecure tends to make people more conscientious and industrious and these persons are no exceptions. They are generally good students and they have been thought by some to possess a higher average mental capacity than do non-allergic persons. This is probably because they tend to apply themselves better to whatever tasks are at hand. They are often thought to be temperamental and unstable because they change rapidly from an attitude of insecurity, hostility and timidity while in a state of allergic imbalance, to one of sociability, agreeableness and cheerfulness when this is corrected.

By simulating other medical conditions allergy often creates diagnostic problems. Abdominal distress is frequently complained of, especially after eating and often before the meal is finished. Parents may think the child is feigning pain to escape their efforts to induce him to eat the foods which they think he should have. Through the best intentions these misguided parents inflict a cruel form of physical and psychological punishment upon these children by forcing them to ingest foods which make them uncomfortable and ill. It is well to point out that the peculiarities of allergic reactions at times produce a reversal of this situation and cause the child to want to take large amounts of the food to which he is sensitive at frequent intervals. Thus a milk sensitive child may drink unusual amounts of milk both day and night. The abdominal pain often leads to a suspicion of appendicitis, and a few years ago, before doctors were allergy conscious, many of these in-

dividuals had healthy appendices removed. Allergic children often complain of leg ache, especially in the evenings and at night. There may be an apparent pallor without actual anemia, puffiness or discoloration under the eyes and unnatural tiredness. These symptoms, especially if correlated with frequent nosebleed common to allergic rhinitis, have often caused the child to be considered a victim of rheumatic fever.

During the early years when there is relatively little immunity to the various infectious diseases, allergic manifestations are rather acute and disturbing, and like most other symptoms at this age are often more objective than subjective. Except when there is definite pain the child does not usually admit that he is ill, and besides he becomes so accustomed to not feeling well that he probably comes to regard the way he feels as normal. In the absence of fever as an alarm gauge, allergic illness must be detected by noting the child's restlessness, irritability and other objective signs. As he develops more immunity to and freedom from infections, the intensity of his allergic reactions lessens, but he becomes sensitive to a greater variety of allergens. There may be frequent respiratory episodes, chronic nasal congestion with discharge, ear troubles, sinus blocking, tiredness, moody spells, abdominal distress, frequent or constant cough during the winter months.

Once the disturbances that accompany growth are through and adolescence is past, the individual settles down into the best period of his life from the standpoint of his allergy. He has numerous sensitivities during this time, but he has good ability to digest and assimilate foods, has a good circulatory system, healthy body cells and tissues that recuperate from fatigue easily, sleeps well and is better equipped to meet the stresses and strains of life than at other ages. He has the youthful capacity to brush aside the many allergic symptoms, eats foods to which he has been proven sensitive, and feels that he has outgrown much of his trouble. This is the period of much vigorous outdoor life, automobile travel and seasonal hay fever. Members of this adult age group probably represent the heaviest consumers of antihistamine drugs and caffeine drinks. Their efficient body physiology enables them to get along fairly well by depending upon such aids.

This favorable situation is enjoyed until the individual has passed through his best years and reaches the age where physical decline begins to set in. This, of course, comes at different ages for different individuals; with many it will be in the forties, some earlier, others later, even in the fifties. Then he finds that while his sensitivity to many allergens has lessened or disappeared, still others were only temporarily submerged to come to the front again as the aging tissues become more vulnerable to injurious agents. And then new ones may always develop. If he has not already done so, he must now begin to learn that he can no longer be so careless about his diet and other factors as he formerly was. The penalty for wrong eating is in the form of abdominal distress such as bloating, feeling of fullness, pain and other disturbances, usually associated with insomnia. Such indiscretions as exposure to cold or getting his feet wet affect him more than they formerly did. His allergies now cause him to have many vague complaints which may be poorly understood by his family, friends and possibly even his physician. They seem to intensify many of the infirmities and complaints that go with advancing age.

If he has the guidance of a competent and understanding physician he should, by this time, be pretty well aware of what his allergies are and be able to cope with them fairly well. On the other hand, if his case has been mishandled or he has drifted from one physician to another he may be thoroughly confused and a complete skeptic regarding any method of treatment. If he depends upon his own resources, he may, by blindly groping around, partially solve some of his troubles. Many develop fads about their eating and may develop so many food prejudices as to deprive themselves of a balanced diet, develop malnutrition, anemia and other deficiencies. Particularly are they apt to shun meats or high protein foods. This age is noted, of course, for the chronicity of its troubles, resulting in such conditions as emphysematous chests with bronchiectatic reservoirs of infected secretions. The poor eating habits, the respiratory difficulties with lack of ability to sleep and rest end the individual's usefulness earlier than it normally would terminate and may also bring his life to an earlier end than need be.

The medical man has a serious responsibility towards these individuals. He should be able to help them modify their living habits to the extent of making them reasonably comfortable, increasing their usefulness and extending their life span. To be able to do this presupposes the necessary understanding of allergic troubles and a close doctor-patient relationship. It is a fortunate patient whose doctor's understanding is enhanced by having allergic difficulties himself. The doctor must be sufficiently interested in the patient and understand his whole life problems. In so far as possible, all the various things in the patient's environment that make him ill or affect him adversely must be discovered. Obviously this cannot be accomplished by having him report to the office for skin testing by a technician and then giving weekly injections and eliminating a few foods. To undertake to treat them without the necessary knowledge and without being able to give them sufficient time, is an injustice to both the patient and the profession. It can result only in shattering the confidence of the former in the ability of any one to relieve him and forcing him into that large group of skeptics who resort to all kinds of self-medication. Almost any allergic individual is willing to cooperate with a doctor if he gets satisfactory relief by doing so.

These patients must be given the clearest possible insight into their condition, they must learn better than the average person that satisfactory living requires discipline with courage and that nature never fails to exact her penalty for disobedience of the rules of the game. They must come to learn that they may, at times, have to put up with discomfort, the cause of which is not readily apparent and may even come to be looked upon as neurotic individuals. They must understand that at such times as they are in poor allergic balance they may feel pessimistic, antisocial, rebellious, and see little good in anything or any person. If possible, they should refrain from making any final important decisions or entering upon any strenuous undertakings during such times, since it is a temporary situation and the entire outlook will change in a matter of time.

The ideal aim, of course, would be complete control of all allergic factors. Since this would constitute human perfection which does not exist, we must be content with results short of this. In fact, the average person does not care to approach perfection too closely and would rather suffer somewhat than to be restricted to a life of too great austerity. Relief from the inhalants is almost completely the doctor's responsibility, requiring the patient to cooperate only to the extent of reporting to the office for tests and injections. Relief from food sensitivity depends mostly upon the individual himself after the doctor has helped to ferret them out. There are certain foods that must be avoided at all times, others may be taken possibly two or three times weekly and still others may be taken once daily. There is some art in being able to avoid certain foods on such occasions as picnics and dinner parties without making oneself too conspicuous in doing so and sometimes one must choose between offending a sensitive hostess or being made ill by partaking of her favorite recipe.

So, the allergic individual is born with a particular type of constitution that goes with him throughout his life. His allergic responses manifest themselves in different forms and to different degrees of intensity at various age periods and there may be comparative freedom from trouble over long periods of time. A satisfactory life for him depends to a large extent upon a close relationship between himself and his doctor who must have a good understanding of his lifetime problems and be able to guide him into the right way of living. The individual himself must understand that to exist with satisfactory freedom from trouble not only calls for advice and treatment from his doctor, but places upon himself the responsibility of following a way of life set out for him. This must not be too restrictive or aim too sharply at perfection. He must be made to feel that worth while results will recompense him for his time and trouble, and to get his continued cooperation such results must be forthcoming. The doctor who understands the problems of these persons and gives them satisfactory aid, more than justifies his place in our profession and in society.

1220 North Walker Avenue

DISCUSSION *(Abstract)*

Dr. Walter L. Rucks, Memphis, Tenn.—Early diagnosis and the institution of proper treatment in the

infant will prevent severe emotional and physical handicaps in later life.

Every physician should recognize the allergic significance of colic, food and formula disagreements, regurgitation, repeated upper respiratory infections and dermatosis in infants.

Allergic symptoms may be so mild that the child can carry on without appreciable difficulty.

Following the removal of adenoids and tonsils the symptoms may be relieved for years only to return subsequently. It is the undiagnosed and untreated cases that lead to trouble in later life.

Some of the more common manifestations of allergy arise from functional imbalance of the autonomic nervous system. Among them allergic rhinitis, asthma, eczema, and diverse anaphylactic reactions. The location of the shock organs are considerably responsible for the different types of reactions produced.

The effect of the autonomic nervous system on the acid-base balance is important, since children cannot withstand tendencies toward acidosis or alkalosis for any appreciable length of time. The early recognition of either of these symptom complexes and the administration of necessary electrolytes to restore a proper balance may be life saving.

Many cases of atopic dermatitis begin *in utero* where the fetus becomes sensitized to food eaten by the mother.

Where allergic reactions are anticipated it is the responsibility of the obstetrician to see that the mother's diet during pregnancy is properly controlled.

After delivery it is the duty of the pediatrician to control the diet so that the infant's shock organs are not insulted. It is not necessary that all of us become allergists but it is my plea that we recognize allergic symptoms in the infant. There should be a cooperative type of association between the pediatrician and the allergist in which both the physical and allergic conditions can be controlled, to prevent children from reaching puberty with skeletal deformities and emotional insecurity.

Asthmatic bronchitis or bronchiolitis, which is usually precipitated by infection, are definitely allergic reactions and should be treated as such. Watchful waiting to secure positive skin reactions to the allergen that we suspect is unnecessary.

Relief can be given these infants by the institution of early treatment. The child of today is the man or woman of tomorrow and it is the responsibility of the pediatrician and the medical profession to see that he grows into adult life with a normal body.

Many of us believe that our knowledge of allergy has reached the point where there is no longer any excuse for respiratory and food allergy of any serious degree in the infant and child.

Educational programs for the medical profession, medical students and laity, and the early recognition and treatment of the allergic child, will give this country fewer emotionally and physically handicapped adults. These programs are vitally necessary if pediatrics is to maintain its place in preventive medicine.

ACUTE AGRANULOCYTOSIS DURING THE USE OF TIBIONE®*

REPORT OF CASE

By JAMES A. DAVIS, M.D.
ARTHUR J. VIEHMAN, M.D.
and
WALTER B. FROMMEYER, JR., M.D.
Birmingham, Alabama

The effect of tibione®† (p-acetylaminobenzal-thiosemicarbazone) upon tuberculosis in man has been the subject of clinical investigation in the United States for approximately one year. As a result of these studies,[1] two basic facts have evolved concerning this drug: (1) tibione® is bacteriostatic in action, being similar in this respect to streptomycin, dihydrostreptomycin and para-aminosalicylic acid, and (2) tibione® is quite capable of producing several toxic side effects in man, its toxicity however, being somewhat less than that of the diamino-diphenyl-sulfone group. Because of the occurrence of a benzene ring in the chemical structure of tibione,® it might well have been predicted that agranulocytosis would eventually become manifest as one of these toxic reactions. The etiologic relationship of the benzene ring to agranulocytosis has been clearly shown by Kracke and Parker.[2] At the present time, acute agranulocytosis as a result of tibione® therapy in tuberculous patients is of the order and magnitude of 1 per cent.[3] The earlier reports from the German investigators defy proper evaluation as to the true incidence, as well as the exact etiology, of acute agranulocytosis occurring during tibione® therapy, since pyramidon,® a drug known to produce agranulocytosis, was administered concomitantly in many instances.

It is the purpose of this report to present the case record of a patient who developed agranulocytosis during the course of tibione® therapy. No drugs of any kind other than tibione® were used in therapeutic management in this patient prior to the appearance of agranulocytosis.

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*From the Jefferson Tuberculosis Sanatorium and the Department of Medicine, Medical College of Alabama, Birmingham, Alabama.

†Supplied by Schenley Laboratories, Inc., Lawrenceburg, Indiana.

CASE REPORT

A 31-year-old white woman entered the Jefferson Tuberculosis Sanatorium on October 28, 1949 because of pulmonary tuberculosis. Routine admission laboratory data revealed a normal urinalysis and normal hematologic data. The sputum was positive for tubercle bacilli and an x-ray of the chest showed pulmonary tuberculosis, moderately advanced, involving the base of the upper lobe and possibly apex of the lower lobe on the left side. Shortly after admission to the hospital, a left pneumothorax was established. Because of persistence of tubercle bacilli in the sputum, in spite of a seemingly good pneumothorax, the patient was bronchoscoped on May 15, 1950. Bronchoscopy revealed a slight to moderate bronchial tuberculosis on the left. In view of this, oral therapy with tibione® was instituted on May 18, 1950. The dosage schedule was 50 mg. daily for one week, 100 mg. daily for the second week, 150 mg. daily for the third week, and 200 mg. daily thereafter. Pneumothorax was maintained during this course of therapy.

The patient did well and on May 24, 1950, two sputum samples were negative for tubercle bacilli. Under continued tibione® therapy she remained asymptomatic until June 20, 1950, at which time she complained of nocturia, frequency, occasional pink color to the urine and a low backache. The patient also complained of painful nodes under both sides of the mandible. A catheterized urine specimen on this date showed a specific gravity of 1.005, an alkaline pH, and a negative reaction for albumin and sugar. Microscopic examination of the urinary sediment showed an occasional leukocyte but there were neither casts nor erythrocytes present. Blood studies were not done at this particular time. Empirically, the patient was started on daily intramuscular injections of 300,000 units of procaine penicillin with no definite diagnosis being established.

On June 24, 1950, routine blood studies were done according to the schedule established at this hospital for patients receiving tibione.® As indicated in *Figure 1*, the following results were obtained: erythrocytes 3,380,000; hemoglobin 10.3 grams; leukocytes 750. The differential cell count showed 99 per cent lymphocytes and 2 per cent basophils. There were numerous blood platelets on the smear. Further questioning of the patient at this time revealed that for the past several days she had had a sore throat, which was now beginning to feel somewhat better. On June 24, 1950, however, she had noted that her gums were beginning to feel quite sore and she also said that she had been feeling depressed for the previous seven to ten days. Her backache was less severe and there was improvement of her genitourinary symptoms. Physical examination revealed a woman who did not appear to be acutely ill. Her temperature was 100.6 degrees; the pulse was 86. The skin was clear. The gums were swollen and there was evidence of an early ulceration on the lower gum. There were large, firm, very tender masses in the area of the submaxillary glands bilaterally. There was no other lymphadenopathy. No rales were heard in the lung fields and the heart was normal with a normal sinus rhythm. There were no masses felt in the abdomen, nor was there any abdominal tenderness elicited on palpation. The liver and spleen were not palpable. At this time a diagnosis of acute agranulocytosis, secondary to tibione,® was made. Treatment consisted of the immediate discontinuance of tibione,® absolute bed rest, continuation of intramuscular procaine penicillin, 300,000 units daily, and avoidance of exogenous infection. The patient had received, in a period of 36 days, a total of 5,200 mg. (104 tablets) of tibione.®

On June 25, 1950, the patient had a temperature of 100.8 degrees and a pulse rate of 108. Her face appeared to be slightly swollen generally, but no other significant changes were noted on physical examination. The leukocyte count was 950.

On June 28, 1950, she had a mild shaking chill. Her gums were still hypertrophic, with ulceration around the gingival margin of several teeth, and there was an ulcer on the posterior pharyngeal wall. The patient's leukocyte count was now 800, with 100 per cent lymphocytes. At this time procaine penicillin was increased to 300,000 units intramuscularly, every 12 hours.

On June 30, 1950, the patient was quite depressed, emotionally unstable and having marked difficulty in voiding. The gums had taken on a very deep purplish red hue and were now markedly hypertrophic. The glands under the mandible were beginning to recede and were no longer tender. There was tenderness in the left upper quadrant on palpation, but the spleen was not palpable. The leukocyte count on this date was 750 with 98 per cent lymphocytes, 1 per cent monocytes and 1 per cent basophils. Urinalysis continued to show a low specific gravity of 1.005 and there was no albuminuria. An occasional leukocyte and a few erythrocytes were present in the urinary sediment but there were no casts.

The patient continued to run a stormy course for the next several days with temperature mounting as high as 105 degrees. On July 3, 1950, she was started on perihemin,® one tablet three times a day, multivitamins and aureomycin troches, one dissolved in the mouth four times daily. There had been increasing discomfort in the perineum for several days, with slight induration of the tissues to the right of the anus. On July 4, 1950, it was noted that there was marked induration and swelling of this area, which now involved the posterior half of the right vulva. The area was quite tender throughout, but not fluctuant. This region was treated locally with analgesic ointment. On July 5, 1950, therapy with streptomycin, 0.5 grams every 12 hours, was instituted, in addition to the therapy outlined above, because of the obvious infection of the perineum. Pavatrine,® 125 mg. three times a day, was also given because of the patient's difficulty in voiding.

By July 7, 1950, the patient's temperature was of a lower order, being between 99 and 100 degrees and, except for the soreness around the rectum, she was markedly improved. There was now purulent drainage from a sinus opening in the right half of the perineum, about one centimeter from the anus. On this date, the patient's blood picture showed considerable improvement as graphically shown in *Figure 1*. The leukocyte count was 2,520. The differential cell count revealed 10 per cent juveniles, 24 per cent stab forms, 58 per cent lymphocytes, 2 per cent monocytes, 6 per

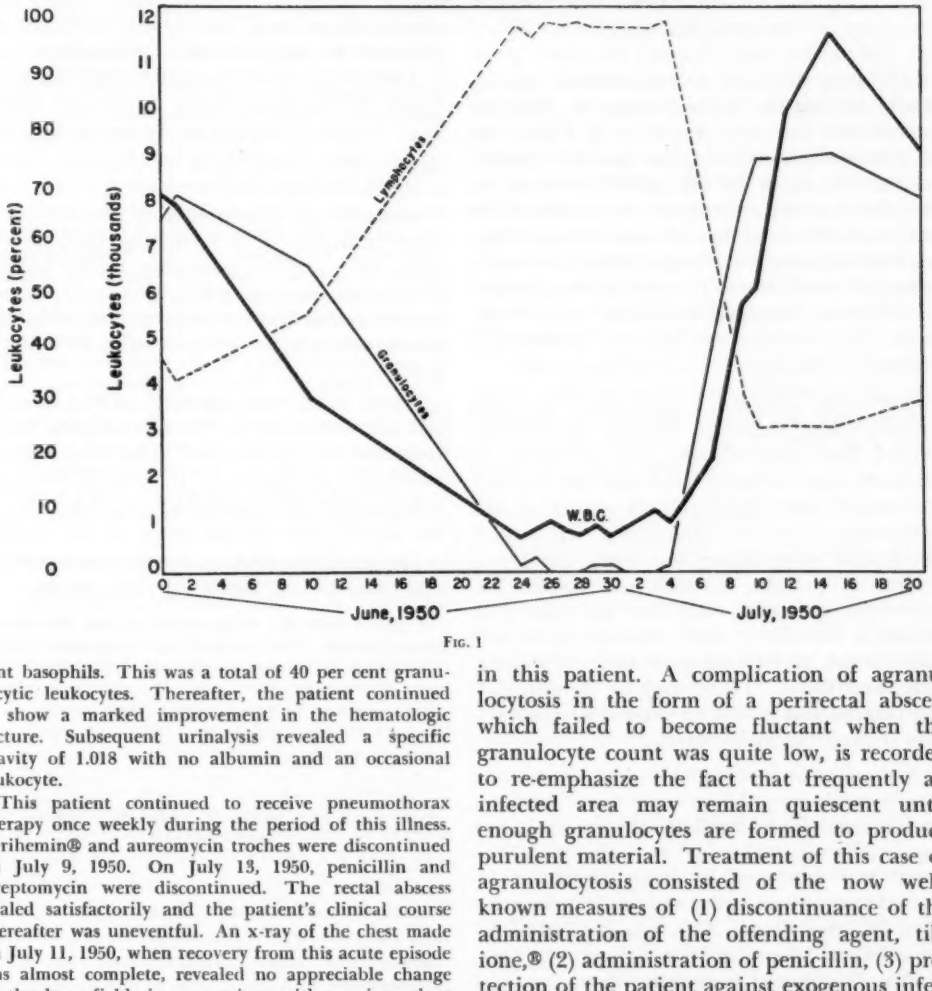

FIG. 1

cent basophils. This was a total of 40 per cent granulocytic leukocytes. Thereafter, the patient continued to show a marked improvement in the hematologic picture. Subsequent urinalysis revealed a specific gravity of 1.018 with no albumin and an occasional leukocyte.

This patient continued to receive pneumothorax therapy once weekly during the period of this illness. Perihemin® and aureomycin troches were discontinued on July 9, 1950. On July 13, 1950, penicillin and streptomycin were discontinued. The rectal abscess healed satisfactorily and the patient's clinical course thereafter was uneventful. An x-ray of the chest made on July 11, 1950, when recovery from this acute episode was almost complete, revealed no appreciable change in the lung fields in comparison with previous chest x-rays.

On July 21, 1950, the patient had a leukocyte count of 9,100 with 68 per cent neutrophils, 30 per cent lymphocytes, 2 per cent monocytes, and 1 per cent basophils.

SUMMARY

The occurrence of granulocytosis during tibione® (p - acetylaminobenzal - thiosemicarbazone) therapy in a 31-year-old white woman with bronchopulmonic tuberculosis is presented. A total of 5,200 mg. (104 tablets) of tibione® had been given within a 36-day period of time. No drugs other than tibione® had been used in therapeutic management prior to the development of agranulocytosis in this patient. A complication of agranulocytosis in the form of a perirectal abscess which failed to become fluctant when the granulocyte count was quite low, is recorded to re-emphasize the fact that frequently an infected area may remain quiescent until enough granulocytes are formed to produce purulent material. Treatment of this case of agranulocytosis consisted of the now well-known measures of (1) discontinuance of the administration of the offending agent, tibione,® (2) administration of penicillin, (3) protection of the patient against exogenous infection conveyed by the physician and other attendants and (4) general supportive therapy. The relationship of the benzene nucleus to agranulocytosis remains important as an etiologic factor in this condition. The occurrence or agranulocytosis in the patient had no effect on the course of tuberculosis.

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TUNG NUT POISONING*

By EDWARD BALTHROP, M.D.
Mobile, Alabama

The tung nut tree, Aleurites fordii, was introduced into the United States in 1932 for commercial reasons. A native of China, its oil constitutes a major import into this country as a drying agent for the paint industry. Its introduction and subsequent establishment in the southern states has created a major new agricultural crop for a large area of the southeastern United States (the southern one-third of Alabama, Georgia, Louisiana and Mississippi, the northern one-half of Florida and eastern Texas.)[1]

The toxic nature of tung nuts has been known a long time.[2,3,4] Holmes[5] in 1907 reported five cases of tung nut poisoning in children, and Palmer,[6] Erickson and Brown,[7] Carratala[8] and Gardner[9] all described the symptomatology in subsequent papers. A short time after eating the seeds, there is a feeling of malaise, warmth and nausea followed by persistent vomiting and diarrhea. There is usually a rapid thready pulse and prostration, abdominal pain of a colicky nature, and thirst. There may be paresthesias, leg cramps and profound central nervous system depression with cyanosis.

A number of investigations have been done on the toxic material in tung nuts. Erickson and Brown[7] found toxicity in tung seeds but not in the oil, and noted that this toxic material was destroyed by heat. Gardner[9] reported tung oil as being only mildly laxative even in large doses. This was confirmed by experiments done in our laboratory here. Godden[10] reported gastroenteritis as the chief microscopic lesion in tung nut poisoning and in another article[11] reported parenchymal damage to the liver and kidneys. Pathology was directly proportional to the amount of tung meal ingested.

The toxic material in tung nuts has not been isolated. Emmel[12] presented good evidence that it may be a saponin, as well as a second agent which is alcohol soluble. Henry[13] thought it was a glycoside, Carratala[8] and Bryan[15] a toxic albumin and Watson[14] a thermolabile and an alcohol-soluble thermostable substance. Confirmatory studies here (hydrochloric acid hydrolysis) indicate the presence in tung nuts of a glycoside.

Lewis[16] at the University of Michigan and Lee[17] at Louisiana State University believe that toxicity is related to the protein fraction of the nuts. In addition Lee believes there is a lipid fraction which is toxic.

Considering the increasing growth of the tung industry, it is surprising that there is little on tung nut poisoning in the medical literature. Because of this and because of good results in this hospital with symptomatic treatment, this subject seems worthy of more attention.

There have been ten cases in this hospital. All but one were in children ranging in age from two to eleven years. The symptoms are tabulated in *Table 1*. In one of the cases information was incomplete so that some of the figures may be too low.

Mild and severe tung nut poisoning are exemplified by the following case reports.

Case 7.—John B., a 9-year-old colored boy, had a temperature of 99.2°, pulse 68, and respiratory rate 24. This child ate six tung seeds five hours before being seen in the emergency room. About thirty minutes after ingestion, he experienced violent nausea, vomiting and diarrhea and severe colicky abdominal pain.

SYMPTOMS AND SIGNS OF TUNG NUT POISONING IN TEN PATIENTS

Nausea	10
Vomiting	10
Diarrhea	10
Dehydration	10
Thirst	10
Abdominal cramps	10
Renal dysfunction*	9
Mydriasis	9
Temperature elevation	8
Tachycardia	7
Tachypnea	6
Cyanosis	5
Headache	5
Irregular respiration	3
Reflexes	Variable

*As evidenced by glycosuria, pyuria, crystalluria or epithelial cells.

TABLE 1

*Received for publication February 13, 1952.

Despite home remedies, vomiting continued until one hour before admission to the emergency room. On examination he showed evidence of minimal extracellular fluid deficit. The pupils were dilated but reactive. The heart was regular and rhythmic. Respirations were regular and the lungs were clear. Reflexes were increased. There was no cyanosis. Blood sugar was 128 mg. per 100 cc. The urine was of high specific gravity (1.028) and contained crystals and epithelial cells. He was given no treatment.

Case 4.—J. S., a 3-year-old white girl, had a temperature of 99.0°, pulse 142, and respiratory rate of 40. This child did not know how many tung seeds she ate. She suffered nausea, vomiting and diarrhea of a protracted nature. She also complained of headache, cramping abdominal pain and pain in the lumbar area of the back. Seven and one-half hours after ingesting tung nuts she was seen in the emergency room. Cyanosis was present around the lips and ears. The heart was rapid but regular. Respirations were irregular but the lungs were clear. The pupils were dilated but reactive. Reflexes were absent. The skin showed marked extracellular fluid deficit. The urine possessed a high specific gravity (1.023), there was a one-plus glycosuria and white blood cells were present. She had a yellow mucous stool which was negative for occult blood. Methemoglobinemia was ruled out as a possible cause of the cyanosis.

She was treated with magnesium sulfate and mineral oil by mouth, coramine and caffeine stimulation, oxygen and intravenous fluids (1,000 cc. of 5 per cent glucose in physiological saline, 1,000 cc. 5 per cent glucose in water). She responded to treatment and was discharged the next morning asymptomatic.

DISCUSSION

The major toxicity of tung nut poisoning is gastroenteritis, as evidenced by the nausea, vomiting, diarrhea, cramps and thirst universally reported. This may progress to serious fluid and electrolyte deficiency. There may also be central nervous system depression as evidenced by cyanosis, paresthesias, mydriasis, irregular respirations and reflex changes. And there may be temporary renal dysfunction, resulting in glycosuria, crystalluria, concentration and casts.

Although the toxic agents are as yet unidentified, the substance causing nausea and vomiting is probably a protein, as was first suggested in Palmer's article,[6] since it is neutralized by heat.[7] Tung nuts and castor beans are both members of the Euphorbiacae. This, plus the known toxicity of the protein ricin, suggests a tempting hypothesis. The diarrhea producing agent is probably the glycoside (saponin) of Emmel. It conforms to the experimental data on tung nut poison, namely: it is water soluble and is destroyed by heat and by hydrolysis.

The similarity of effect of atropine and tung nuts on cardiac, gastrointestinal, eye, central nervous system and body temperature suggests the possibility of pilocarpine as an antidote. However, symptomatic treatment is highly successful. No patient needs gavage because of vomiting. Replacement of fluid and electrolyte loss is probably the one most important measure, but central nervous system depression may be so severe as to demand primary consideration. The renal toxicity seems to dissipate itself when renal circulation is adequate.

Magnesium sulfate may be a specific antidote, either as an osmotic diluent of the toxic material in the gastrointestinal tract or as a detoxifying agent, since proteins are denatured by the sulfate ion.

SUMMARY

The symptoms and treatment of tung nut poisoning are discussed. The pathology is primarily gastroenteritis and central nervous system depression, but renal and liver parenchymal damage may occur. A successful method of symptomatic treatment is presented. The possible use of pilocarpine as a specific antidote is mentioned.

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A CRITICAL ANALYSIS OF THE YOUNG AND ELDERLY PRIMIPARAS*

By JOHN M. NOKES, M.D.
W. N. THORNTON, JR., M.D.
Charlottesville, Virginia
and
TOM C. KING, JR., M.D.
Anniston, Alabama

Numerous references[1 2] have been made to the elderly primiparas in obstetrics during the past few years, but there have been few studies made upon young primiparas. It would seem timely that the extremes of reproductive life be contrasted. With this in mind, a critical analysis of the extremely young and elderly primipara is made.

Cases to be analyzed from the Department of Obstetrics and Gynecology of the University of Virginia Hospital include 17,019 deliveries from January 1, 1936 to January 1, 1951. The report includes both ward and private deliveries, the latter constituting approximately one-third of the entire series reported. Thus, it is in sharp contrast to the report of Arnot[1] which is concerned entirely with private patients. No distinction will be made between ward and private patients, as it has been the privilege of two of us (J.M.N. and W.N.T., Jr.) to supervise the deliveries of most of these patients.

We wish to define the young primapara as an individual 17 years of age or less. The patient who is 35 years of age or more is considered an elderly primipara. The ages in each group are correct as they were obtained from the birth certificates of the newborns. In many instances, the young primiparas had been delivered in this hospital and their charts were available for confirmation of age.

Race Distribution.—Table 1 would seem to indicate that the colored patient has her children earlier in life than the white, and accordingly has less chance of being classified as an elderly primipara.

Table 2 shows the age incidence of each group of primiparas. It is interesting to note that there were only four patients older than 42 years of age, and fifty-one were less than 15 years of age.

Duration of Pregnancy in Weeks.—The duration of pregnancy was difficult to estimate from menstrual dates given, particularly in the young. In some instances the patient did not know the date of her last menstruation, or perhaps she attempted to correlate menstrual date with the time of her marriage.

Prenatal Care.—Adequate prenatal care is defined with difficulty. A minimum of six prenatal visits was considered adequate prenatal care, whereas less than this number of visits was considered inadequate care. Patients seen for the first time on admission to the hospital were classified as having received no prenatal care. *Table 4* shows that only 31 per cent of the young primiparas received adequate care, while 81 per cent of the elderly primiparas received adequate care. Few of

DISTRIBUTION ACCORDING TO RACE

	Young Primiparas	Elderly Primiparas
White	501	172
Colored	393	29
Total	894	201
Percentage of Total Deliveries	5.3	1.2

TABLE 1

AGE INCIDENCE

	YOUNG											
Years	13	14	15	16	17							Total
Number of Patients	10	41	123	301	419							894
	ELDERLY											
Years	35	36	37	38	39	40	41	42	43	44	45	Total
Number of Patients	51	45	22	27	26	15	7	4	1	2	1	201

TABLE 2

DURATION OF PREGNANCY

Weeks	40	48	36	35	34	32	30	28	26	24	22
Young	676	26	40	1	21	74	14	28	3	11	0
Elderly	161	6	5	0	10	12	4	1	0	1	1
Total	837	32	45	1	31	86	18	29	3	12	1

TABLE 3

ADEQUACY OF PRENATAL CARE

	Cases	Adequate	Inadequate	No Care
Young	894	275	428	191
Elderly	201	161	27	12
Total	1095	437	455	204

TABLE 4

*Read in Section on Obstetrics, Southern Medical Association, Forty-Fifth Annual Meeting, Dallas, Texas, November 5-8, 1951.

*From the School of Obstetrics and Gynecology, Department of Medicine, University of Virginia, Charlottesville, Virginia.

the elderly primiparas were clinic patients, and this may explain the high incidence of adequate care in this group.

Incidence of Contracted Pelvis.—In most instances the diagnosis of contracted pelvis was a clinical one, but represented the opinion of more than one examiner. During the past ten years x-ray pelvimetry has been used as confirmatory evidence. The incidence of contracted pelvis in the young primiparas was 14.8 per cent, and 18 per cent in the elderly primiparas. Since the diagnosis of contracted pelvis was not confirmed by x-ray pelvimetry in the early years of this study, we believe these percentages to be high.

Complications of Pregnancy. — *Tables 6a* and *6b* illustrate rather strikingly the high incidence of toxemias of pregnancy in patients who received inadequate or no prenatal care. Anemia was listed as a complication of pregnancy only when it was of such severity as to require transfusion. The high incidence of syphilis stresses the importance of a law recently passed in Virginia which requires that any person attending a pregnant woman during gestation shall take or cause to be taken a sample of her blood for a serological test for syphilis within fifteen days of the first examination. Twenty-four (12 per cent) of the 201 elderly primiparas were found to have demonstrable myomas of the uterus, but these tumors did not seem to influence the pregnancy.

Duration of Labor.—The length of the first stage is determined to the nearest full hour because of the uncertainty attending the actual onset of labor. The duration of the second and third stages is accurate except in those patients in whom dilatation was complete on admission, in those patients who came to cesarean section, and in some patients with eclampsia. These have been deleted from the study for statistical purposes.

Table 7 shows no significant difference in the duration of the first and second stages of labor in the two groups. However, the third stage of labor was two and one half times longer in the elderly group.

Method of Delivery.—*Tables 8a* and *8b* show the methods employed in the delivery of patients in each group. The one instance with forceps to the floating head with subsequent craniotomy was done in 1936, and was employed as an ill-advised attempt to save a baby with prolapsed cord. The incidence of mid-forceps delivery in the young was 2 per cent, whereas the incidence was 10 per cent in the vaginal deliveries in the elderly group. The fetal head failed to rotate in seven instances in the young group, and eight of the fourteen mid-forceps procedures in the elderly were for failure of rotation of the fetal head. The cesarean section incidence of 2 per cent in the young primiparas is considerably less than our average incidence of 3.9 per cent

INCIDENCE OF CONTRACTED PELVES

	Young	Contracted	Elderly	Contracted
White	501	60	172	31
Colored	393	72	29	5
Total	894	132	201	26

TABLE 5

COMPLICATIONS OF PREGNANCY, YOUNG

Eclampsia	27	22 inadequate or no care
Pre-eclampsia	159	113 inadequate or no care
Anemia	9	
Pyelitis	20	
Syphilis	26	17 inadequate care
Gonorrhea	1	
Rheumatic heart	3	
Infectious diseases, acute		
Chicken pox	1	
Measles	1	
Pertussis	1	
Mumps	1	
Vaginal bleeding	11	
Multiple sclerosis	1	
Paroxysmal tachycardia with spastic hemoplegia	1	
Avitaminosis	1	
Appendicitis	1	
Congestive failure	1	
Amniotic sac infection	1	

TABLE 6a

COMPLICATIONS OF PREGNANCY, ELDERLY

Pre-eclampsia	30	13 had inadequate or no care
Myoma	24	
Vaginal bleeding	7	
Pyelitis	2	
Anemia	1	
Syphilis	1	(abruptio placentae, still-birth)
Paresis	1	

TABLE 6b

DURATION OF LABOR

	First Stage	Second Stage	Third Stage
Young	15 hrs.	56 min.	12 min.
Elderly	14 hrs.	77 min.	30 min.

TABLE 7

during the fifteen-year period covered by the study. The 28.8 per cent cesarean section rate in the elderly primiparas was probably the result of more lenient indications for section in the early years of the study. Cesarean section has been employed as the method of delivery on eight occasions in the last fifty-nine elderly primiparas, or in an incidence of 13.5 per cent. The nine Porro procedures in the elderly group were for large myomas. In the same group of patients, there were six low cervical sections with myomectomy and preservation of reproductive function.

Complications of Labor.—Of the sixteen third-degree lacerations shown in *Table 9*, only one involved the rectal lumen. The incidence of premature separation of the placenta in the young primiparas was lower than one would expect in view of the high incidence of toxemia in this group. The incidence of prolonged labor (30 hours or longer), is not considered significantly different in the two groups. The incidence was 7 per cent in 143 vaginal deliveries in the elderly primiparas, and 5.3 per cent in 876 vaginal deliveries in the young group.

The anemias shown in *Table 10* were not due to postpartum hemorrhage, but were of such severity as to require transfusions. The postoperative pneumonia and lung abscess occurred after cesarean section. In spite of the fact that many patients were admitted late in labor and without proper preparation, no instance of aspiration or postoperative pneumonia occurred in the vaginal deliveries. The two recto-vaginal fistulae resulted from infection and breakdown of episiotomies and were not results of pressure necrosis.

Sex and Weight of Children.—In the group of young primiparas there were 26 cases in which the weight of the baby exceeded 4,000 grams, and there was one child which weighed 4,795 grams. The average weight of these 26 children was 4,229 grams. In the elderly group there were seven cases in which the weight of the child exceeded 4,000 grams, the heaviest weighing 4,545 grams. The average weight for these seven children was 4,199 grams. There was no other evidence that the pregnancy exceeded 40 weeks in duration, nor was there demonstrated evidence of diabetes

METHOD OF DELIVERY OF YOUNG

Spontaneous	666
Forceps, low	172
Forceps, mid	18
Floating head with craniotomy	1
Breech	25
Version with breech extraction	1
Cesarean section, classical	4
Low cervical	11
Extraperitoneal	3

TABLE 8a

METHOD OF DELIVERY OF ELDERLY

Spontaneous	75
Forceps, low	49
Forceps, mid	14
Breech	6
Cesarean section, classical	6
Low cervical	41
Extraperitoneal	2
Porro	2

TABLE 8b

COMPLICATIONS OF LABOR

	Young	Elderly
Prolonged labor	46	10
Postpartum hemorrhage	14	3
Third degree lacerations	14	2
Premature separation of placenta	1	2
Prolapsed cord	3	0
Neglected transverse presentation	1	0
Obstructive labor due to ovarian cyst	1	0
Retained placenta	0	3
Cervical laceration	0	1

TABLE 9

PUERPERAL COMPLICATIONS

	Young	Elderly
Endometritis	180	27
Pyelitis	66	5
Cystitis	21	5
Anemia	29	8
Postpartum psychosis	1	2
Mastitis	3	2
Pneumonia with lung abscess (postoperative)	1	0
Infectious disease, acute		
Measles	1	0
Mumps	1	0
Otitis media	1	0
Recto-vaginal fistula	2	0
Thrombophlebitis	1	1
Erysipelas	0	1
Parametritis	0	1
Uremia and acute hepatitis	0	1
Bladder atony	0	5
Cholecystitis	0	1

TABLE 10

SEX AND WEIGHT OF CHILDREN

Young	Males	Females	Average Weight
901	470	431	3,070 grams*
Elderly	Males	Females	Average Weight
200	94	106	3,198 grams*

*Any child weighing less than 1,000 grams excluded.

TABLE 11

mellitus in any mother. There were seven sets of twins in the young, six being male and the other being female. In one case of twins in the elderly group, the babies were of the opposite sex. The sex of two children was not recorded and they are not included in *Table 11*.

Fetal Mortality.—Table 12 shows the uncorrected stillbirths and neonatal deaths encountered in the two groups. Two cases of infant death were a result of congenital defects incompatible with life. Five of the infant deaths resulted from eclampsia in the mother and thirteen from pre-eclampsia. Three stillbirths resulted from prolapse of the umbilical cord. Thirteen infant deaths were the result of unexplained prematurity. No single cause can be ascribed to the remaining fifteen deaths.

Maternal Mortality.—There were four maternal deaths in the young primiparas and one in the elderly group. All five of these deaths occurred prior to the year 1945.

The elderly primipara who died was admitted to the hospital on three occasions for the treatment of hyperemesis. Interruption of pregnancy was advised on the basis of uncontrolled hyperemesis and hypertension but was refused. She was admitted on the fourth occasion in uremia and died in the twenty-second week of pregnancy from acute hepatitis and uremia.

The four maternal deaths in the young primiparas occurred in patients with toxemia of pregnancy, two having eclampsia and two severe pre-eclampsia. Three of the patients did not receive any prenatal care and the other was seen on only one occasion early in her pregnancy. The immediate cause of death in one was acute pulmonary edema in severe pre-eclampsia. Death in another patient was the result of pneumonia and septicemia. This death occurred in 1939 and it is possible that modern methods of combatting infection may have prevented this maternal death. The immediate cause of death in the remaining two patients was postpartum hemorrhage. Careful review of the charts of these two patients would seem to indicate that today, with our methods of promptly replacing blood loss, these deaths would be classified as preventable.

FETAL MORTALITY

	Still-births	Neonatal Deaths	Total	Mortality Per Cent
Young	25	15	40	4.4
Elderly	5	6	11	5.4
Total	30	21	51	4.6

TABLE 12

SUMMARY AND CONCLUSIONS

(1) A review of 1,095 primiparas in 17,019 patients delivered during the past fifteen years is reported. This includes 894 primiparas 17 years of age or less, and 201 primiparas 35 years of age or older.

(2) The adequacy of prenatal care is reflected in the maternal and fetal survival rates.

(3) The duration of labor and the weights of the babies in the two groups show no significant differences.

(4) There were 24 instances of myoma of the uterus in the elderly primiparas, and these tumors were certainly a contributing factor in the high incidence of cesarean section in this group.

(5) The high incidence of mid-forceps (10 per cent of the vaginal deliveries) among the elderly was a result of failure of rotation in eight of the fourteen patients.

(6) Factors influencing maternal mortality in the two groups are discussed.

(7) The uncorrected fetal mortality of 5.4 per cent in the elderly primiparas as compared with the rate of 4.4 per cent in the young would not seem to indicate that pregnancy in the elderly primipara is more hazardous for the child.

(8) Although the incidence of operative delivery is higher in the elderly than in the young, it would not seem that pregnancy and delivery are more fortuitous for the average elderly primipara.

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DISCUSSION *(Abstract)*

Dr. Roy Lee Grogan, Ft. Worth, Tex.—There is little difference in the incidence of young and elderly primiparae on our service, in private institutions in Fort Worth and in out-patient departments.

Adequacy of prenatal care is certainly reflected in the maternal and fetal survival rate. In more than 18,639 deliveries at one hospital here within the past ten years only three maternal deaths have occurred, all

of which occurred before 1947: one from thrombosis, one from postpartum pneumonia due to regurgitation of vomitus and aspiration under anesthetic and one with death on the delivery table following regurgitation of vomitus and blockage of the trachea which could not be relieved by bronchoscopy. There is a lower incidence of eclampsia in this section, perhaps due to the difference in climate; therefore, no death has been reported which may be due to eclampsia occurring during pregnancy.

There is no perceptible difference in duration of labor with the exception of the second stage in which it is the practice of most of the obstetricians in this section to use elective low forceps with median perineotomy thereby shortening the second stage of labor. The third stage of labor is markedly shortened apparently by intravenous use of either ergotrate® intravenously or 0.5 cc. of pitocin® and 5 cc. of distilled water given intravenously. Weights of babies apparently have not varied greatly from the reported number by the writers. The incidence of myomata here seems to be comparable entirely to that of Drs. Nokes, Thornton and King, but the incidence of myomata in white patients I believe will approximate 27 or 28 cases in the past 18,639 deliveries that have been studied. In colored patients this incidence is very much greater and inasmuch as a careful survey has not been made due to the shortness of time of preparation of the discussion, figures can hardly be authentic.

As a matter of discussion, incidence of mid-forceps is much lower according to the old schedule of nomenclature; however the revision of the classification of forceps delivery is going to reflect greatly on the incidence of mid-forceps.

In summarizing, it is observed that in 18,639 deliveries, the percentage is as follows:

Forceps of all types, 72.4 per cent.
Spontaneous deliveries, 16.1 per cent.
Cesarean section, 4.4 per cent.
Breech deliveries, 3.6 per cent.
Stillborns, 5 to 9 months, 1.4 per cent.
Multiple births, 1 per cent.
Version extraction, 0.1 per cent.
Maternal deaths, 0.017 per cent.
Full term newborn deaths, 0.7 per cent.

The factors influencing maternal mortality in all patients have briefly been discussed. There is no difference in the fetal mortality or maternal mortality in young and elderly primiparae. The mid-forceps delivery according to the old classification is used but rarely in this section and certainly not by the specialists in obstetrics. Most generally mid-forceps are used by general practitioners and there apparently is no control over this procedure.

There is no apparent difference between the fetal mortality rate in young and elderly primiparae.

Dr. Nokes (closing).—While our incidence rate of cesarean section in the elderly group is high, we might express our personal views on a more practical basis. Given any five elderly primiparas, three will deliver vaginally without any undue difficulty, one will require cesarean section, and the other will eventually deliver *per vaginam*, but before delivery is effected we shall wish perhaps that we had done a section.

THE TREATMENT OF NONSPECIFIC URINARY INFECTIONS*

By W. Leslie Bush, M.D.
Dallas, Texas

There is an increasing danger of carelessness in the treatment of genitourinary infections. This is due to a state of overconfidence in the so-called wonder drugs which have been made easily available since World War II, and which have been overzealously detailed as cure-alls.[1] Yet there is not one single drug or antibiotic available today which will kill all types of bacteria either *in vitro* or *in vivo*. In order to treat infections of the upper urinary tract specifically and effectively, without undue loss of time and without incurring needless expense and discomfort to the patient, a detailed study of the genitourinary tract must be made to determine whether or not associated pathologic conditions such as developmental anomalies, obstructions, stones or tumors are present. We are all aware of the fact that in the presence of any of these, therapy with any one or all of the urinary antiseptics is futile, and yet we continue to see patients treated for pyuria for long periods without any visualization of the upper urinary tract.

To determine whether or not infection is present in the urine is a relatively simple matter, but on the other hand sources of error originating in an improperly collected specimen are still encountered frequently. Voided specimens from females may contain purulent discharges from the vagina, cervix and adjacent glands, while catheterized specimens from the same individual may be free of pus. In the male the first part of the urine voided may contain pus from the urethra, vesicles and prostate, while the second glass may be clear. For these reasons, only catheterized specimens from females and the second glass from males should be used for examination. The laboratory report of so many pus cells per high power field is no longer sufficient. The sediment from a centrifuged urine is transferred by means of a platinum loop to a slide, the slide is fixed and stained with Gram's stain and examined under an oil immersion lens. This immediately establishes whether the or-

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ganism is a coccus or a bacillus and whether it is gram positive or negative. In 90 per cent of urinary infections no further studies such as culture of the organism are necessary.[2] However, if it is found that the organism is resistant to the first five to seven days of treatment with the proper drug, then definitive cultures should be run without delay. It is also necessary to determine whether or not the specimen is acid or alkaline, by the use of nitrazene paper or the LaMotte type of urine reaction indicator, as several of the drugs are effective only in acid urine. Several types of organisms found in the urinary tract have the property of splitting urea with the production of ammonia and an alkaline urine, which cannot be rendered acid by using any of the urine acidifiers. Obviously drugs which are effective only in acid urine will be of no value here.

Before the beginning of administration of any urinary antiseptic, the determination of renal function is as important as the identification of the organism.[3] The efficiency of urinary antiseptics is in direct proportion to the ability of the kidneys to eliminate the drugs in the urine, and the resulting concentration of the drug in the urine. Kidneys which are diseased to the extent that they cannot concentrate urine will not concentrate the drug in sufficient strength to kill bacteria. There is also the added factor that if we administer a toxic drug which the kidneys are unable to excrete, it will accumulate in the blood stream and produce a variety of toxic manifestations. Although all physicians called upon to treat urinary infections have not an accessible well equipped laboratory, nevertheless there are simple tests which will provide a working knowledge as to the adequacy of renal function in the large majority of instances. For instance, a specific gravity of 1.024 or above after dehydration of the patient for 18 hours or a random specimen which has a specific gravity of 1,020 or higher, may be accepted as representing a fairly normal renal function, in the absence of sugar in the urine. The phenolsulfonphthalein test is so popular and well known that it requires no further comment. If the facilities are available, the injection of diodrast® following 18 hours of dehydration and followed by roentgenograms of the genitourinary tract will furnish more information than any of the other function tests. In the presence of normal function the pelves should be filled within five to ten minutes after injection of the dye, but serial films may be necessary in diseased kidneys. Unilateral disease with marked decrease in function is clearly indicated in excretory urography. In patients who do not respond favorably within the first two weeks of treatment, as well as patients who are suffering from a recurrent infection, excretory urograms should always be made.[3] It is preferable to do this in a quiescent stage although this is not necessary. If the excretory urograms are unsatisfactory, then cystoscopy, ureteral catheterization, and bilateral uretero-pyelograms should be done. This instrumentation should as a rule be done after the acute stage of the infection has subsided (except in the presence of complete ureteral obstruction), because of the danger of producing a bacteremia or septicemia. The finding of an anomaly, obstruction or stone will explain the cause of failure of the therapy.

A new era in the treatment of urinary infections began with the introduction of sulfanilamide 13 or 14 years ago. Since that time we have witnessed the waning popularity of sulfanilamide, sulfathiazole and sulfadiazine in succession. This waning in popularity has been due in large part to their relative insolubility and toxicity. At the present stage of development of sulfonamide antiseptics, gantrisin and the triple sulfonamide compounds which are much more soluble and less toxic, have replaced sulfathiazole and sulfadiazine in the chemotherapy of urinary infections. It is not necessary to maintain a high blood level of any of the sulfonamides in order to obtain a bacteriocidal concentration of the drug in the urine. As a rule sixty grains a day for two days followed by thirty grains daily for one or two weeks is sufficient. An equal dosage of soda bicarbonate should be given with the triple sulfonamides together with sufficient fluid to maintain a urine output of at least 1,500 cc. in 24 hours. Although the renal complications following use of the triple sulfa compounds are far less than those following sulfathiazole or sulfadiazine alone, one should be alert for the occurrence of crystalluria or tubular damage. Febrile reactions from the triple sulfas is not infrequent and occasional sensitivity occurs. Renal or ureteral colic, hematuria, the presence of sulfa

crystals in the urine, or a urine output that drops below 1,500 cc. daily should put one on guard, but the drug need not be discontinued immediately unless the urine output drops below 1,000 cc. in 24 hours. In the event that this does occur and the drug is stopped, if the urine output does not increase within 24 hours, ureteral catheterization and ureteropelvic lavage to eliminate obstruction by crystals should be considered. In some instances the ureters may be so occluded by crystals that catheterization is impossible and uretero-pyelostomy or nephrostomy to obtain renal drainage may become necessary. In hot climates where body fluids are concentrated by profuse sweating more careful supervision is required. It has been repeatedly demonstrated that the administration of appropriate amounts of alkali during sulfonamide therapy prevents renal reaction due to precipitation of these compounds. The triple combination of sulfa is effective against almost all urinary tract organisms except Pseudomonas, Proteus, and Streptococcus fecalis.

Gantrisin is the only member of the sulfonamides which is highly soluble and effective in an acid urine, and is well tolerated without the use of forced fluids or alkalis.[4] Gantrisin appears to be nontoxic even when given in large dosages over prolonged periods of time, and the occurrence of allergic reactions is much less frequent than that from the triple combinations. Agranulocytosis is a remote complication which may result from any of the sulfonamides as their basic chemical structure is the same. *In vitro* and *in vivo* clinical tests have revealed that gantrisin is highly effective against Proteus, Aerobacter, Alkaligenes fecalis, staphylococcus and Streptococcus.

Penicillin is highly effective against most of the gram positive organisms, especially the staphylococcus.[5] Its use in streptococcic infections has been largely replaced by aureomycin and terramycin. There are two characteristics of the mode of action of penicillin which should be kept in mind: first, laboratory and clinical investigation has shown that an insufficient dosage may result in the development of resistant strains of the organism, and for this reason the initial dosage should be considerably larger than the succeeding doses. Likewise the administration of penicillin over too short a period of time may result in the development of resistant strains. It is recommended that the drug be administered for a period of five to seven days even though the urine may be pus free and the gram stain reveals no organisms. The second factor to be kept in mind is that penicillin is bacteriostatic, an inhibitor of growth, exerting its effect upon the reproductive cycle of the organism.[6] The sulfonamides on the other hand are bacteriocidal. Although it is stated that penicillin is not subject to the action of interference by pus, tissue autolysates, or peptones as are the sulfonamides, the establishment of a free flowing urinary drainage is a prerequisite if a satisfactory result is to be obtained. Although cure has been reported in 75 per cent of pure pyogenic coccus infections, its use in pure and mixed infections with gram negative organisms should be supplemented by sulfonamides or some other antibiotic. It is also well to remember that it has been reported that the gram negative rods including coli contain penicillinase which destroys the inhibitory effect of penicillin. Proteus produces no penicillinase, but its growth is not affected by penicillin.

Streptomycin and dihydrostreptomycin have proven to be highly effective against Escherichia coli, but are not effective against E. intermedium or Pseudomonas. Proteus vulgaris infections are effectively controlled in approximately 40 per cent, but the occurrence of drug fastness is frequent. Other bacteria manifesting gram-negative staining characteristics such as Aerobacter aerogenes, paracolon, and Alcaligenes fecalis are sometimes resistant and sometimes sensitive in about equal percentages.[7] At the present writing the streptomycins have been discarded in the routine treatment of gram-negative urinary tract infections, because of the frequent development of drug resistance. Their use is reserved for the treatment of tuberculosis of the urinary tract.[8]

The broad spectrum antibiotics have their limitations, but all are highly effective against Escherichia coli. Since gantrisin, sulfacetamide, and mandelamine are relatively inexpensive, well tolerated, and just as effective as the more expensive antibiotics, the less expensive deserve first trial. Aureomycin is the drug of choice against Escherichia inter-

medium, and terramycin is second choice. Terramycin is the drug of first choice against Aerobacter aerogenes and aureomycin is second. Aureomycin is most effective against paracolon coliforme and terramycin is second. Pseudomonas aeruginosa is a very resistant organism, which responds best to polymyxin. However polymyxin B (which has been released for clinical use recently) is both nephrotoxic and neurotoxic. The nephrotoxicity is in the form of cortical damage and is apparent only when the dosage of polymyxin exceeds 3 mg. per kilogram of body weight per 24 hours.[9] The nephrotoxic symptoms disappear after four or five days. Terramycin and aureomycin occupy second place in treating pseudomonas infections. Gantrisin is the drug of choice against Proteus vulgaris and chloramphenicol is second. Although there is no proof of synergistic effect, there is increasing evidence that the results may be better if gantrisin and chloramphenicol are given concurrently.

Aureomycin and terramycin are both effective against Alkaligenes fecalis and Streptococcus fecalis. Mandelamine is highly effective against Streptococcus fecalis and has the added advantage of being inexpensive.

Although penicillin is the drug of choice against staphylococcus infections, terramycin is also very effective.

Cultures with *in vitro* sensitivity tests on specimens obtained from the genitourinary tract have proven to be an effective adjunct in the management of infections, particularly those of a chronic nature. This regimen has economical recommendations for its use in that trial and error use of expensive antibiotics is thus eliminated.[10]

Therapeutically, the over-all effect of two or more antibacterial agents has frequently been found superior to that obtained from one drug, and some clinical studies have been carried out indicating that this therapeutic effect was correlated with the inhibition of drug resistance by combined therapy.[11]

It has been felt by many that the bacteria in the urine have their origin from the fecal flora. Bacteriological examination of the fecal flora and correlation of these findings with those of the urinary flora is obviously a very complex problem. Although there is no experimental proof, there is considerable clinical evidence that the intestinal flora may influence the urinary flora.[11] If this be true it may explain the changes in urinary flora, and apparent drug resistances during therapy, and may justify the use of sulfasuxidine and sulfathalidine in controlling resistant coliform infections.

In summary then we should remember that in treating urinary tract infections we must first make a correct diagnosis, including the identification of the causative organisms. Second, we must relieve urinary stasis by adequate drainage of the kidney pelvis or by removal of the obstruction such as stone, tumor or stricture. Third, we must maintain an adequate intake of fluids, so that the daily fluid output is not less than 1,500 cc. Fourth, a carefully selected urinary antiseptic should be used, basing our choice upon the particular organism present. In acute urinary infections the chosen antiseptic should be administered for a period of 7 to 14 days, unless there is a definite indication for stopping the drug earlier. If infections persist after this, then urine culture and drug sensitivity tests should be done followed by the administration of the more effective antiseptic. If there is still infection present after two weeks of intensive therapy a complete urinary tract study is indicated. When a patient, whether it be infant or adult, clinically manifests persistent hyperacute urinary infection after four to six days of intensive medical therapy, a complete urologic study is in order.[5]

All persistent infections of the urinary tract are caused by poor drainage and will recur unless the obstruction is located and corrected. Chemotherapeutic agents and antibiotics are of incalculable value in the control of infections but are not to be substituted for the application of investigation and surgical principles.

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DISCUSSION *(Abstract)*

Dr. Dolphus E. Compere, Fort Worth, Tex.—I should like to emphasize and reiterate a few principles which are important in the management of nonspecific urinary tract infections.

A methylene blue or gram stain of the urine sediment will tell the physician whether he is treating a coccal or a bacillary type of infection. This information will enable him to use, as Dr. Bush suggests, one of the less expensive sulfa drugs or antibiotics. It is our experience that in the absence of obstructive or other organic urinary tract disorders, approximately 80 per cent of the infections will respond to this initial therapy. In those cases having persistent or recurrent urinary tract infections we advocate, besides the complete urological investigation, cultures with sensitivity studies to ascertain the most efficient antibiotic and thereby save time as well as expense to the patient in clearing up his infection.

I should like to suggest a relatively new and simple method of culture and sensitivity study which may be carried out easily in the office of most physicians. The Difco Laboratories of Detroit, Michigan, have prepared some small paper discs which are impregnated with aureomycin, chloromycetin, terramycin, dihydrostreptomycin, penicillin and bacitracin. These discs may be implanted on agar plates which have been previously inoculated with the test organism by either the smearing or the streaking method. These agar plates are incubated at 37° centigrade for twelve hours and those discs having a clear zone around them will signify the effective antibiotic. It is easy to detect which of the antibiotics will be the most effective depending upon the area of clearing. Although this does not afford the physician the knowledge of the exact organism with which he is dealing, this information is not important as the most efficient antibiotic can be ascertained and utilized.

Dr. Kenneth M. Lynch, Jr., Charleston, S. C.—I should like to offer for your consideration a variation in technic which has resulted in the saving of considerable time in our hands. In cases of urinary tract infection, we take a specimen for sensitivity tests to the various antibiotics as well as culture. The sensitivity test is run by placing pledgets infiltrated with the various antibiotics on a blood agar plate streaked with the urine sample. The patient is then started on gantrisin therapy. The antibiotic of choice is reported in 24 to 48 hours and this is substituted for gantrisin. Our patients are usually well by the time we get a report on the culture and the offending organism is entered in the record for statistical purposes.

REFRACTURE OF THE SHAFT OF THE FEMUR*

By JESSE N. BORDEN, M.D.
Baltimore, Maryland
and
WILLIAM S. SMITH, M.D.
Columbus, Ohio

Refracture is a complication of fracture of the shaft of the femur seldom mentioned in the literature. An analysis of twenty-five refractures occurring in twenty-three soldiers is presented.† Serial x-rays from the time of the original fracture were available in all cases. These were all young, healthy males in excellent physical condition prior to the original fracture.

Our refracture cases were studied from the standpoint of (a) anatomical location (b) presence or absence of infection (c) type of fracture (d) initial treatment (e) circumstance of refracture (f) roentgen status of the original fracture at the time of the refracture and (g) observations of the process of repair of the refracture.

THE ORIGINAL FRACTURE: TYPE, LOCATION, TREATMENT AND PRESENCE OF INFECTION

Sixteen of the fractures were originally compounded (70 per cent) and nine (30 per cent) were simple. All but three cases were comminuted. Anatomically, the original fracture occurred most commonly near the midportions of the shaft, while the ends were spared, as shown in *Table 1*.

At the time of refracture seven cases were draining from a chronic osteomyelitis. Four of these had an acute exacerbation of the infection within a few days following refracture. Two others apparently arrested, also developed a flare-up within a few days. Four patients had had metallic internal fixation shortly after the original fracture. Three patients had bone grafts for nonunion prior to refracture.‡ The earliest case to become ambulatory with support following the initial fracture was 128 days, the longest 712 days,

*Received for publication April 29, 1952.

†These occurred in various Army General Hospitals. The observations were made at the Oliver General Hospital, Augusta, Georgia, prior to October 1946.

‡Simple fractures of the bone graft itself were not included in this series.

and the average 314 days. Twelve patients had sequestrectomies or saucerizations performed at some time prior to refracture.

CIRCUMSTANCES OF REFRACTURE

The circumstances of refracture are noted in *Table 2*. Eight refractures occurred in bed patients, seventeen in ambulatory patients. In the ambulatory group, braces were prescribed for nine patients. The earliest refracture after the patient was allowed up in a brace was nine days, the latest 588 days, and the average 181 days. In the entire group, the earliest refracture after the original injury was 128 days, the latest 935 days, and the average was 433 days. This may indicate the difficulty of specifying a time factor in the healing of all fractures of the shaft of the femur.

ANATOMICAL LOCATION OF ORIGINAL AND REFRACTURES

Subtrochanteric	Junction of Upper and Middle One-Thirds	Middle One-Third	Junction of Lower and Middle One-Thirds	Supracondylar
2	6	9	8	0

TABLE 1

CIRCUMSTANCES OF REFRACTURE

Caliper prescribed but not worn. This group includes delinquents, wheel chair accident falls near the bed or in the swimming pool.	9
Caliper worn at time of a fall	4
In bed with no support	3
No support prescribed (one bath tub accident)	4
In skin traction	1
In operating room being prepared for sequestrectomy	2
In bed with suspended Thomas splint	1
During manipulation of knee	1

TABLE 2

ROENTGEN STATUS OF THE FRACTURE AT THE TIME OF REFRACTURE

Only five of the cases were considered to have a good alignment prior to refracture. Posterior lateral angulation was most commonly encountered, occurring in ten cases. The degree of deformity varied from 5° to 40.°

Osteosclerosis was a common finding inasmuch as many cases were previously infected. This finding, along with that of loss of bone substance was striking in eleven cases. It is to be noted that this type bears a striking similarity to the so-called pathological fracture. Avascular necrosis of comminuted fragments, sequestration, and saucerization were other factors noted.

COMPARISON OF FIRST EVIDENCE OF CALLUS FORMATION AFTER ORIGINAL AND REFRACTURE BY INDIVIDUAL CASES

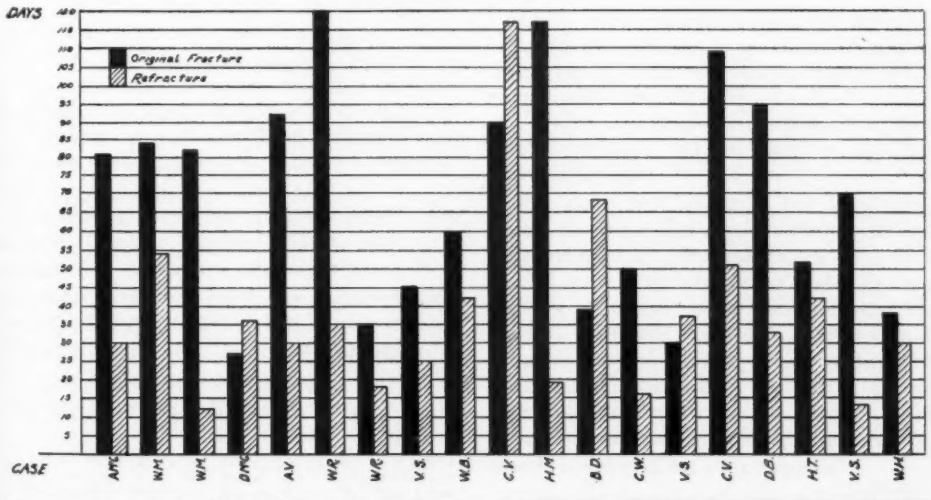

CHART 1

In fifteen cases, the roentgen criteria for ambulation were considered precarious (hind sight) by the authors.

STAGE OF REPAIR

When writing this paper, our cases were in various stages of repair of the refractures, so that extensive comparisons with the original fractures were not practical. One point of interest, however, was available for study in nineteen cases. This was a comparison of the rapidity of callus formation following the original fracture and the refracture. The average number of days that callus was noted by x-ray after the original fracture was seventy-three days, while the average number of days that the callus was first evident after refracture was thirty-seven. Individual comparisons in the available cases are shown in *Chart 1*. A case in which metallic internal fixation was done following refracture shows a reversal of this relationship of callus formation of the original to the refracture.

Another point of interest was the fact that following refracture there is very little displacement of the fragments in the type in which there was marked sclerosis.

SUMMARY

(1) Twenty-five refractures of the shaft of the femur in twenty-three patients have been studied.

(2) Compound comminuted fractures predominated in this series.

(3) The average interval between the original injury and the refracture was 433 days.

(4) The circumstances of refracture were varied, but a fall while not wearing a caliper accounted for more than any other.

(5) Osteosclerosis associated with bone loss was considered an important factor in the production of refracture in eleven cases.

(6) Poor alignment was considered a factor in eleven cases.

(7) Acute exacerbation of the chronic osteomyelitis followed refracture in six cases.

(8) Posterolateral angulation was the commonest type of deformity seen prior to refracture.

(9) Callus forms with approximately twice the rapidity in refracture as compared with the original fracture of the shaft of the femur.

(10) There is usually little displacement of the fragments following refracture.

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CAUSE OF CANCER

ACTH and cortisone have been reported to ameliorate a few cases of malignancy, as they have been reported to relieve isolated cases of many other clinical diseases. Sometimes a definite reduction in the size of the growth has been reported. More often, there have been no beneficial effects. Recent investigations in Chile upon the effect of cortisone upon experimental mouse tumor metastasis are clear cut and capable of throwing light upon the entire problem of tumor development.

The South American workers[1] report that in more than two hundred routine transplantations of a mammary adenocarcinoma in a particular strain of mice, no metastases occurred. Local growth of this tumor was inhibited by cortisone. However, inhibition of the local growth was accompanied by the appearance of multiple metastases.

Using mice about two months old, of both sexes, a saline suspension of the transplantable mammary adenocarcinoma was injected into the left flank. Eight or nine days later when local growth of the tumor had reached about 7 mm. in diameter, daily injections of 0.5 mg. of cortisone in saline in the opposite thigh were begun. Experimental and control animals were killed and examined at twenty-four to forty-one days after inoculation; others were left to survive to natural death.

Increase in size of the tumors of the cortisone treated animals was little; they remained practically stationary. At the end of the experiment the average weight of the local growth in untreated animals was 5.6 to 15.7 grams, while the average weight in treated animals was 0.6 to 1 gram, a notable difference in favor of the cortisone treated. No untreated animal had metastases, but between a third and a half of those which received cortisone injections developed multiple metastases. The metastases involved axillary, inguinal, mesenteric and retroperitoneal nodes, the mediastinum, peritoneum, pleura, liver, spleen, kidney, lung, diaphragm, and the muscles of the thigh. Small nodules were present everywhere on the peritoneum except in the region contiguous to the local growth.

The cortisone induced metastases could be inoculated into other animals as readily as the original tumor. In the new host, they produced no metastases unless the host was treated with cortisone.

There were notable histologic differences between the growths of cortisone treated and untreated animals. In the control group the tumor was classified as encephaloid solid cancer, degree 4 of Broder's classification. In the treated animals, central necrosis was much more extensive.

The delay and arrest of the local growth under cortisone therapy, the South American investigators say, was due either to a change in the mitotic activity or to a change in the balance of rate of production and destruction of cells. Cortisone had two different antagonistic actions on resistance of the mice to the transplanted adenocarcinoma: first, a protective antitumorigenic action through inhibition of local tumor growth; and second, it acted as a stimulant to metastasis.

The phenomenon of metastasis, they say, is

1. Agosin, M.; Christen, R.; Badinex, O.; Gasic, G.; Neghme, A.; Pizarro, O; and Jarpa, A.: Cortisone-Induced Metastases of Adenocarcinoma in Mice. Proc. Soc. Exper. Biol. and Med., **80**:128 (May) 1952.

not simply one of the signs of malignancy as such, but a sign of a special phase of malignancy, possibly of malignancy in decay. The longer the animals survived, the greater was the incidence of metastasis in the cortisone treated. Implication of the endocrine balance in tumorigenesis, they say, is beyond doubt.

Dr. John E. Gregory,[1] of Pasadena, California, has just published a very interesting small volume upon the pathogenesis of cancer, and applied therapy. He considers that he has proved that all malignancies, animal and human, are due to a virus, the same virus, which he has repeatedly photographed under the electron microscope and has found in all human cancer tissue examined. In many instances he reports remissions of moribund cases by the use of certain antibiotics: bacitracin and others prepared by himself. His book is freely illustrated with photographs of patients before and after treatment, and with microscopic sections from the growths removed surgically. In mice of tumor bearing strains, Gregory reports induction of cancer or shrinking and control of the growths, by various hormone treatments. Pituitary hormone added to agar cultures of cancer virus, he says, increases the growth rate. He uses several endocrine preparations in therapy of human malignancies, upon somewhat indefinite criteria, emphasizing, however, the often forgotten fact that the quantity used is as important as the preparation. All endocrine products have an optimum dosage for the particular patient, too little being useless and overtreatment damaging. Overactivity of the adrenal gland, he says, is to be avoided. His is an interesting volume with good microphotography.

The demonstration that metastases of a non-metastasizing mouse carcinoma are induced by cortisone, need in no way contradict the hypothesis that a virus causes cancer. The sudden rapid spread of tuberculous disease which cortisone induces, may resemble the spread of experimental cancer metastasis after cortisone injections. The mechanisms of these effects are being studied in a large number of laboratories, and the experimental work has much promise for future therapy. Interesting also are reports from Rutgers University,[1] of a non-toxic material, a chemical called TEM, which causes regression of the majority of Flexner-Jobling rat carcinomas. An antibiotic which will inhibit clinical virus disease, or possibly malignant disease, would seem to be nearer.

1. Gregory, John E.: Pathogenesis of Cancer and Applied Therapy. Boston: Bruce Humphries, Inc., 1952.

POLIOMYELITIS SUSCEPTIBILITY

For many years the study of such diseases as infantile paralysis was made difficult by scarcity and expense of susceptible laboratory animals. The chief experimental animal used was by necessity the monkey. Various reports recently have described methods of increasing the susceptibility of the common small laboratory animal to a number of bacteria formerly considered nonpathogenic for them.

Minneapolis workers[2] have increased the pathogenicity for white mice of several species of microorganisms, by a combination of two therapeutic agents, x-radiation and cortisone. The two administered twenty-four hours before experimental inoculations, considerably enhanced the lethal effects of poliomyelitis virus, a Coxsackie virus, Candida albicans, and Blastomyces dermatitidis. There seemed to be a synergistic effect. The authors believe that susceptibility to many other organisms can be increased by the same technic, and suggest that they have here a method applicable to study of many diseases, a source of much new bacteriologic information, and a method of study of the phenomena of susceptibility and resistance.

Elsewhere another technic has been described of shortening the incubation period before onset of paralysis in experimental poliomyelitis, and thus presumably increasing the virulence of the infection. According to Milzer, Weiss and Vanderbloom,[3] pertussis vaccine, diphtheria toxoid, or Salmonella typhimurium vaccine, can significantly decrease the incubation period before onset of paralysis in mice infected with the Lansing

1. Crossley, M. L.; Allison, J. B.; and Muenzen, J. B.: Treatment of Flexner-Jobling Carcinoma in Sprague-Dawley Rats with 2, 4, 6-Triethylenimino-s-Triazine. Proc. Soc. Exper. Biol. and Med., 80:452 (July) 1952.
2. Sylverton, Jerome T.; Werder, Alvar A.; Friedman, Jack; Roth, Frank J. Jr.; Graham, Asa B.; and Mira, Ovido J.: Cortisone and Roentgen Radiation in Combination as Synergistic Agents for Production of Lethal Infections. Proc. Soc. Exper. Biol. and Med., 80:123 (May) 1952.
3. Milzer, A.; Weiss, M. A.; and Vanderbloom, R.: Proc. Soc. Exper. Biol. and Med., 77:485, 1951.

strain of poliomyelitis. Dean, Cohen, and Dalldorf[1] note that mice injected in a foreleg with pertussis vaccine alone or combined with diphtheria and tetanus toxoids, following infection with mouse encephalomyelitis virus, were paralyzed more frequently in the injected limb. Milzer and associates[2] investigated various allergens and antibiotics, to discover whether these shortened or lengthened the period of incubation of poliomyelitis. No shortening effect was observed on the incubation period of the paralysis after intraperitoneal inoculation of various pollens, horse serum, or house dust, or the antibiotics, dihydrostreptomycin, terramycin, and penicillin.

Thus, useful prophylactic agents can increase the susceptibility of animals to these maladies, and possibly could render nonsusceptible animals susceptible. It is probable that considerable caution should be used in administering prophylactic inoculations to children during a period when poliomyelitis or another viral infection is increasing.

A BLOOD CHANGE IN EPILEPSY

Epilepsy being one of the common disorders of unknown etiology, which is improved in some instances by non-specific therapy, most of the new remedies are still being tried upon it. It has been reported to be benefited by cortisone. Characteristic blood chemical changes for epilepsy have been sought by many investigators.

Experimental convulsions may be induced by changes in the blood level of such minerals as sodium, potassium, and calcium. Eclamptic convulsions are often accompanied by excessive hydration. Choreiform conditions would seem to be less common than formerly, were perhaps associated with rickets and have decreased with increasing control of this condition with fat-soluble vitamins.

Drury, Holler, and Smith,[3] of Rochester, New York, have reported a blood chemical change which occurs in epileptic and not in normal subjects, based upon alterations in the blood potassium curve after injection of epinephrine. Epinephrine, it will be recalled, is believed to stimulate the anterior pituitary to release adrenocorticotropin, which in turn stimulates the adrenal cortex, hormones of which then alter several mineral and other blood constituents. The pattern of change in plasma potassium after epinephrine differs in normal persons and in epileptics, according to the Rochester workers. The potassium of epileptics before administration of epinephrine is slightly lower than in the normals. Four minutes after an epinephrine injection, the epileptic plasma potassium fell considerably more than did that of normals; in twenty minutes the difference was considerably greater, as it was in one or two hours. The greater fall of epileptic plasma potassium suggests perhaps a greater instability of control of this mineral in epileptic individuals.

Psychological factors affect the incidence of epileptic convulsions. Increased epinephrine secretion is of course believed to be one of the alarm reactions.

The fall of eosinophils in epileptics after epinephrine and after ACTH is less than that of normals. Whether the eosinophil count and plasma potassium level have any relation to one another is a matter for physiologists to determine. An eosinophil, or acid-loving cell, should be one which contains an excess of base, possibly potassium. When there are increased eosinophils, some base, perhaps potassium, is being released inside these cells. Epinephrine, according to Smythe, Nickel, and Bradley,[1] of New York, depresses the urinary excretion of sodium and potassium in normal human subjects, although the volume of the urine is usually increased by this hormone. In the epileptics after epinephrine, plasma potassium is abnormally lowered, and possibly urinary excretion of the element diminished, and increased quantities of potassium should logically have entered the muscles, red cells, or other tissues. Further studies upon potassium metabolism may give information upon the etiology of the epileptic state.

1. Dean, D. J.; Cohen, S. M.; and Dalldorf, G.: Proc. Soc. Exper. Biol. and Med., 77:834, 1951.
2. Milzer, Albert; and Nicholson, Freddie: Effect of Various Allergens and Antibiotics on Experimental Poliomyelitis. Proc. Soc. Exper. Biol. and Med., 80:442 (July) 1952.
3. Drury, Abraham; Holler, Jacob W.; and Smith, Caleb: The Changes in Plasma Potassium Level after Epinephrine in Normal Human Beings and in Persons with Epilepsy. J. Clin. Investig., 31:440 (May) 1952.

1. Smythe, Cheves McC.; Nickel, J. F.; and Bradley, S. E.: The Effect of Epinephrine (USP). J. Clin. Investig., 31: 499 (May) 1952.

TWENTY-FIVE YEARS AGO

From Journals of 1927

Suprarenal Cortical Hormone.[1]—Complete loss of the suprarenals is followed, usually quite promptly, by death. The weight of evidence favors the view that it is the cortex that is essential to life . . . Epinephrine . . . is no longer regarded as essential to life . . . Rogoff and Stewart of Northwestern University have attempted anew to ascertain whether the suprarenal cortex produces . . . a product that possesses the power of definitely increasing the period of survival after removal of the suprarenals . . . extracts of fresh adrenals . . . in some way prolonged the life of the animals in the absence of the adrenals . . . In these days of the successful isolation of hormones, it is not too much to expect that the suprarenal cortex also may soon disclose its potent constituent.

Classification of Arthritis.[2]—The whole subject of arthritis is still in a state of uncertainty and confusion . . . The most serviceable clinical grouping is that of the Goldthwait school. The types of cases are listed as: (1) infectious; (2) atrophic; (3) hypertrophic. . . . (1) the pure infectious type may occur at any age. It is characterized by the widest range of pathological changes . . . (2) The atrophic type is a disease of youth or of middle age. It is characterized by early soft fusiform swellings of the joints . . . (3) the hypertrophic type is a disease of middle and old age. . . . It is characterized by a degeneration and slow destruction of cartilage on the main bearing surfaces of the joint with increased activity of the perichondrium at the periphery of the joint, with the formation of rims or spurs of new bone. . . . Every case of infectious arthritis imposes a peculiar obligation of the physician. . . . He must . . . search earnestly for the focus of infection.

Alcohol in Patent Medicines.[3]—The Eighteenth Amendment and the Volstead Act gave a great stimulus to one branch of the "patent medicine" industry—that devoted to the exploitation of alcoholics sold under the guise of home remedies. . . . There was "Tona-Vin" which tasted like cheap sherry . . . was found to contain 18 per cent alcohol and an insignificant amount of medication. . . . There was "Vita Pep" . . . with an alcohol strength of 16 per cent . . . advertised and sold by the case. . . . It was said to "take away that tired run down feeling" . . . and doubtless it did. . . . "Hostetter's bitters" has for years contained 25 per cent alcohol . . . one-half the strength of straight whiskey.

1. Editorial: A Hormone of the Suprarenal Cortex. J.A.M.A. 89:1984, 1927.
2. Schauffler, Robert McE.: Arthritis: A Simple Classification Illustrated by Its Application to a Series of Cases. J.A.M.A. 89:1749, 1927.
3. Propaganda for Reform. Peruna—Ancient and Modern. J.A.M.A. 89:1444, 1927.

Book Reviews

Synopsis of Genitourinary Diseases. By Austin I. Dodson, M.D., F.A.C.S., Professor of Genitourinary Surgery, Medical College of Virginia; and Donald L. Gilbert, M.D., Instructor in Urology, Medical College of Virginia, Richmond, Virginia. Fifth Edition. 313 pages, with 122 illustrations. St. Louis: The C. V. Mosby Company, 1952. Price $4.00.

The fifth edition of this popular handbook of genitourinary diseases has a few minor changes over previous editions consistent with recent advances made in urology. The principle change is a brief discussion of the application of the newer antibiotics and chemotherapy in the treatment of genitourinary tract infections. In this fifth edition Dr. Donald L. Gilbert is co-author with Dr. Austin I. Dodson.

This pocket size synopsis presents a very careful outline of genitourinary diseases for the medical student. The busy practitioner will also find it a handy, practical reference. The volume is too concise, however, to be considered a satisfactory text book.

Chapter I discusses urological diagnosis. Chapter II discusses the urological instruments recommended for general practice; minor urological procedures; and medications, including antibiotics and chemotherapy. Chapter III is a brief description of the anatomy of the genitourinary organs. Chapter IV deals with congenital anomalies. The additional ten chapters are arranged primarily accordingly to the etiology of various diseases. Numerous helpful illustrations are included. The drawings by Miss Helen Lorraine are especially good.

The table of contents is outlined and there is an adequate index for rapid reference.

Office Endocrinology. By Robert B. Greenblatt, B.A., M.D., C.M., Professor of Endocrinology, Medical College of Georgia; Chief of Endocrinology, University Hospital. With a foreword by G. Lombard Kelly, M.D., President, Medical College of Georgia, Augusta. Fourth Edition. 561 pages, illustrated. Springfield, Illinois: Charles C. Thomas, Publisher, 1952. Price $10.50.

The author has ingeniously brought together in brief, well written chapters, a great deal of information on endocrinology and allied subjects. It is simply presented for the practicing physician or student who needs a ready reference without unnecessary details. There are numerous good illustrations of various endocrine diseases which add much to the teaching value of the book. A good bibliography ends each chapter.

Two sections are devoted to female and male endocrinology with the inclusion under each heading of a brief summary of most subjects pertaining to female or male endocrine disease. One section is devoted to explaining the action, uses and contraindications of the various hormones. Another gives every possible

diagnostic procedure of value in an endocrine survey and explains their usefulness in arriving at a diagnosis.

This book is designed for office use as a quick reference to the various endocrine diseases, diagnostic procedures and hormone therapy. It is well worth keeping upon the physician's consultation desk.

Urological Pathology. By Peter A. Herbut, M.D., Professor of Pathology, Jefferson Medical College and Director of Clinical Laboratories, Jefferson Medical College Hospital, Philadelphia, Pennsylvania. 2 Volumes, 1222 pages with 527 illustrations. Philadelphia: Lea & Febiger, 1952. Price $24.00.

This is a comprehensive two-volume work primarily concerned with the surgical pathology of diseases of the urinary system and the male genital tract. Clinical data are included, as the author points out, to broaden the usefulness of the volumes and to create more reading interest.

In contrast to many texts on pathology the author presents the subject material from a regional basis rather than a disease point of view. One will agree with him that this approach is inevitably accompanied by a certain degree of overlapping. Nevertheless, it is a practical and convenient method of presentation for the clinical surgeon.

The fundamental principles of embryology, anatomy, and physiology are summarized before the disease processes are discussed. The pathology of the various diseases of each portion of the urinary tract and the male genital tract are described under the headings of congenital anomalies, inflammations, tumors and mechanical disturbances. In addition, with the exception of a few rare entities, the individual diseases are discussed according to definition, distribution, course, clinical manifestations, gross appearance, microscopic appearance, spread (in connection with tumors), complications, clinicopathologic correlation, diagnosis, treatment and prognosis.

The pathological descriptions are adequate and well written. The brief paragraph devoted to clinicopathological correlation, in which the author explains the clinical manifestations in the light of the pathological changes and (or) disturbed function, are informative and warrant commendation.

An excellent chapter on diseases of the adrenal gland is included.

The short paragraphs devoted to diagnosis and treatment, for the most part, are merely generalizations and serve only a limited purpose. In a work of this nature the space allotted to diagnosis and treatment could well be omitted.

There are numerous illustrations in black and white. Many are reproduced from older works and are inferior when compared to illustrations in present day urologic texts.

An extensive bibliography follows each chapter.

The volumes should serve as a helpful reference to the urologist and others interested in urological surgery. The work will probably have special appeal to the urologist in training and to the candidate preparing for the American Board examinations in urology who desires a review of pathology and the basic sciences pertinent to urology.

The History and Development of Neurological Surgery. By Ernest Sachs, A.B., M.D., Research Associate in Physiology, Yale University, New Haven; Formerly Professor of Clinical Neurological Surgery, Washington University School of Medicine, St. Louis. First Edition. 158 pages, illustrated. New York: Paul B. Hoeber, Inc., 1952. Price $5.00.

This small monograph outlines the origin and development of neurological surgery as this specialty has come of age. The author has witnessed and contributed to many of the forward strides which have carried the specialty to its present high level of achievement, from very humble beginnings in the early nineteen hundreds. He thus gives a personal flavor to an engaging sketch of the evolution of a specialty.

He elucidates the obscure origins of neurological surgery among the ancients, and traces its tedious progress to the late nineteenth century. At that time the brilliant British school of neurology laid the foundations for the later great advances in diagnosis and surgical treatment developed by the American pioneers in this field, notably Cushing, Spiller, Frazier, Elsberg, Dandy and the author. The final chapter records the development of the various procedures and technics which constitute the basis of contemporary neurological surgery.

The text is well illustrated, and constitutes an excellent, if somewhat brief, survey of the subject. There is a comprehensive bibliography.

Renal Function. Transactions of the Third Conference, October 18-19, 1951, New York, New York. Edited by Stanley E. Bradley, Department of Medicine, College of Physicians and Surgeons, Columbia University. 210 pages, illustrated. Packanack Lake, New Jersey: Josiah Macy Jr. Foundation Publications, 1952. Price $3.50.

With the publication of the *Transactions of the Third Conference on Renal Function*, the Josiah Macy, Jr. Foundation continues to record the highly interesting developments currently in progress in the realm of renal physiology. Whereas the first two conferences dealt with renal tubular function and endocrine control of renal function respectively, the latest volume is concerned with physical factors in urine formation, such as passage of substances across capillary walls, intrarenal pressure and renal blood flow, and mechanisms of formation of glomerular fluid. Since most of the discussions necessarily deal with theoretical considerations in physical chemistry involving complex mathematical formulation, this volume will probably appeal primarily to physiologists and clinical investigators in this field. Two of the discussions which are of particular interest to the clinician, however, are those dealing with the artificial kidney and with the tubular secretion of potassium and acid.

Prescription for Medical Writing. A Useful Guide to Principles and Practice of Effective Scientific Writing and Illustration. By Edwin P. Jordan, M.D., and Willard C. Shepard. 112 pages with 26 figures. Philadelphia and London: W. B. Saunders Company, 1952. Price $2.50.

This valuable book is a most useful guide to the

principles and practice of effective scientific writing and illustration.

It is written by Dr. Jordan, former Associate Editor of the *Journal of the American Medical Association* and by Willard C. Shepard, Art Editor of the W. B. Saunders Company. These well qualified authors have assembled in a small volume a tremendous amount of information for the physician who plans to write a book, a journal article or any sort of scientific material for publication.

It is a book full of short-cuts and of tricks of the trade that will save many hours of wasted effort. It includes compact information on practically everything pertaining to scientific writing from the actual choosing of the subject to the checking of the proofs. The chapter on illustrations is particularly comprehensive and helpful.

Any physician whether he is an embryo writer or one experienced in the art would be wise to add this volume to his personal library.

Introduction to Clinical Neurology. By Gordon Holmes, M.D., F.R.S. Second Edition. 188 pages. Baltimore: The Williams and Wilkins Company, 1952. Price $4.00.

Careful study of this small volume will be of great benefit to physicians entering upon the investigation of clinical neurological problems. The approach is almost exclusively clinical, many of the ancillary diagnostic procedures such as roentgenology, electroencephalography, etc., being intentionally omitted. The literary style is such that the reader has the feeling that this great clinician is standing by his side helping him to understand the phenomenon observed in the clinical examination. The only regrettable feature is a complete lack of bibliography to guide the student in further reading to supplement the brief presentations in this volume.

A Synopsis of Neurology. By W. F. Tissington Tatlow, M.D., M.R.C.P. (Lond.), Medical Registrar, Maida Vale Hospital for Nervous Diseases, London; J. Amor Ardis, M.B., Ch.B., D.P.M. (Brist. & Lond.), Senior Registrar in Psychiatry, Aberdeen General and Mental Hospitals; and J. A. R. Bickford, M.R.C.S., L.R.C.P., D.P.M. (Brist.), Senior Registrar in Psychiatry, Maryfield Hospital, Dundee and Dundee Mental Hospital, Gowrie House. 513 pages, illustrated. Baltimore: The Williams and Wilkins Company, 1952. Price $6.50.

This volume consists of two main divisions. The first is a straightforward presentation of neuroanatomy and neurophysiology without clinical correlations, the second part being a systematic consideration of clinical neurology. There are also sections concerned with additional diagnostic measures such as radiology and electroencephalography. The clinical section is cross-referenced to the section on neuroanatomy. The arrangement has the advantage of allowing rapid consideration of a clinical syndrome without having to wade through neuroanatomical considerations unless they are necessary. The section on clinical neurology is in outline form. The telegraphic style gives rise to many ambiguous constructions which are liable to misrepresentation. The need for brevity necessitates dogmatic statements without allowance for clinical variation. One could also take exception to the terminology such as the use of "hematoporphyrinuric neuritis" for the neuritis of acute porphyruria, to "convergence reflex" for accommodation reaction and to others. The drug terminology is British and might be a little confusing to American readers. There is an adequate index.

This book would be useful as an outline in the hands of an experienced lecturer but would not serve satisfactorily as either a rapid reference volume or textbook.

Books Received

Papers of the Centennial Meeting of the Kentucky State Medical Association, the Ephraim McDowell Memorial Meeting. With a historical sketch of the Association by the Editor, Dr. Emmet Field Horine. 160 pages, illustrated. Louisville, Kentucky: Kentucky State Medical Association (620 South Third Street), 1952. Price $5.00.

Physical Diagnosis. By Harry Walker, M.D., F.A.C.P., Professor of Clinical Medicine, Medical College of Virginia, Richmond, Virginia. 461 pages, with 126 illustrations. St. Louis: The C. V. Mosby Company, 1952. Price $8.00.

Textbook of Gynecology. By Emil Novak, A.B., M.D., D. Sc. (Hon.), F.A.C.S., F.R.C.O.G. (Hon.), Assistant Professor Emeritus of Gynecology, Johns Hopkins Medical School; and Edmund R. Novak, A.B., M.D., F.A.C.S., Instructor in Gynecology, Johns Hopkins Medical School, Baltimore. Fourth Edition. 800 pages, illustrated. Baltimore: The Williams & Wilkins Company, 1952. Price $9.00.

Principles of Organic Evolution. By Arthur Ward Lindsey, Professor of Biological Sciences in Denison University, Granville, Ohio. 375 pages, with 216 illustrations. St. Louis: The C. V. Mosby Company, 1952. Price $5.75.

The Science of Biology. By William C. Beaver, Ph.D., Head of the Department of Biology, Wittenberg College, Springfield, Ohio. Fourth Edition. 895 pages, with 375 illustrations. St. Louis: The C. V. Mosby Company, 1952. Price $5.85.

Culdoscopy. A New Technic in Gynecologic and Obstetric Diagnosis. By Albert Decker, M.D., D.O.G., F.A.C.S., Clinical Professor of Gynecology and Obstetrics, New York Polyclinic Medical School and Hospital; Associate Attending Physician in Gynecology and Obstetrics, New York Polyclinic Hospital; and Attending Gynecologist, Knickerbocker Hospital. With a Foreword by Richard W. TeLinde, M.D. 148 pages, illustrated. Philadelphia: W. B. Saunders Company, 1952. Price $3.50.

The Treatment of Injuries to the Nervous System. By Donald Munro, M.D., F.A.C.S., Surgeon-in-Chief, Department of Neurosurgery, The Boston City Hospital; Associate Professor of Neurosurgery, Boston University School of Medicine; Assistant Professor of Neurosurgery, Harvard University Medical School. 284 pages, illustrated. Philadelphia: W. B. Saunders Company, 1952. Price $7.50.

Ophthalmic Glossary. By M. R. Goldman, M.D., Assistant in Department of Ophthalmology, Montefiore and Passavant Hospitals. Pittsburgh, Pennsylvania. 40 pages. Pittsburgh, Pennsylvania: Richard Rimbach Associates (921 Ridge Avenue), 1952. Price $2.50.

Problems of Aging. Transactions of the Fourteenth Conference September 7-8, 1951, St. Louis, Mo. Edited by Nathan W. Shock, Chief, Section on Gerontology, National Heart Institute, National Institutes of Health and the Baltimore City Hospitals, Baltimore, Maryland. 138 pages. Packanack Lake, New Jersey: Josiah Macy, Jr. Foundation Publications, 1952. Price $3.00.

Recent Advances in Nutrition Research. With Emphasis on the Newer B Vitamins. Proceedings of the Scientific Sessions of the Seventh Annual Meeting, The National Vitamin Foundation, Incorporated, New York City, April 3, 1952. Nutrition Symposium Series, Number 5, August 1952. 129 pages. New York: The National Vitamin Foundation, Inc. (150 Broadway), 1952. Price $1.50.

Dr. Ralph S. Sappenfield

A MESSAGE TO THE SOUTHERN MEDICAL ASSOCIATION FROM THE PRESIDENT OF THE DADE COUNTY MEDICAL ASSOCIATION

On the occasion of the 1952 Annual Meeting of the Southern Medical Association, it is my pleasure and privilege as President of the Dade County Medical Association, to extend greetings and a hearty welcome on behalf of every one of our seven hundred members, to you of the Southern Medical Association.

The ladies of the Woman's Auxiliary and our members as individuals, and as groups, have arranged various social gatherings and entertainment for you and for us to enjoy together. Bring the family. Bring your golf clubs, fishing gear and sport clothes and come prepared to use them.

There are convenient and desirable accommodations available to you and your family. The very interesting exhibits and meetings will be easily accessible.

After years of thought and effort the medical school here appears as a reality for this Fall. It is located at the University of Miami and you are cordially invited to visit the school.

Our Medical Service Bureau, telephone 82-7512, will be on the job twenty-four hours a day to give information on the meetings, entertainment and social events. Please call on the Bureau.

We know you will benefit from and enjoy your visit to the Miami area and we are every one looking forward to renewing old acquaintances, making new friends and doing what we can for you while you are here.

RALPH S. SAPPENFIELD, M.D., President

Dade County Medical Association

Miami, Florida, August 1, 1952

Southern Medical News

ALABAMA

The new Veterans Administration Hospital, Birmingham, will open this fall. Dr. Lloyd B. Andrews, now manager of the Veterans Administration Hospital, Big Springs, Texas, will be manager of the Birmingham hospital.

A renewal grant of $31,000 for cancer research to the Medical College of Alabama, Birmingham, and the Jefferson County Health Department has been announced by the Federal Security Agency. The money will be used for developments of new methods of diagnosis and will be under the supervision of Dr. Joseph K. Cline. This is the fifth year the medical center has received the grant and each one for a similar amount.

Dr. Ethel Stuteville, Birmingham, will be associated with the Permanente Hospital, Oakland, California, having discontinued her practice in Birmingham recently.

ARKANSAS

Dr. Eugene Crawley, Little Rock, has been elected vice-president of the University of Arkansas Alumni Association.

Dr. D. A. Rhinehart, Little Rock, has been appointed emeritus professor of roentgenology, University of Arkansas School of Medicine.

Dr. W. A. Henry, Russellville, has returned to his practice after doing special work in cardiology at Northwestern University, Chicago.

Dr. Pat Murphy, Little Rock, has been appointed emeritus professor of neurology, University of Arkansas School of Medicine.

DISTRICT OF COLUMBIA

Medical Society of the District of Columbia will hold its 23rd annual scientific assembly in Washington, Hotel Statler, September 29-October 1, under the presidency of Dr. Wallace Mason Yater.

Medical Service of the District of Columbia at its fourth annual meeting held recently elected Dr. Donald Stubbs, president; and reelected all other officers: Dr. William P. Herbst, first vice-president; Dr. G. Halsey Hunt, second vice-president; Bruce Baird, treasurer; Douglas R. Smith, assistant treasurer; Theodore Wiprud, secretary and George B. McGovern, assistant secretary; Drs. Frank D. Costenbader, Arch L. Riddick and Henry L. Darner were elected to serve on the Executive Board.

Children's Hospital Alumni Association has elected Dr. Preston A. McLendon, president; Dr. Harold M. Hobart, vice-president; and Dr. Archibald MacPherson, secretary.

George Washington University Medical Society has installed Dr. Herman S. Hoffman, president; and elected Dr. Luther H. Snyder, president-elect; Dr. Leland E. Stevenson, first vice-president; Dr. Elma B. Carr, second vice-president; and Dr. Richard H. Fisher, secretary-treasurer. The retiring president, Dr. John H. Lyons, was elected councilor for five years.

Washington Orthopedic Club has elected Dr. Julius S. Neviaser, president; Dr. Carl Berg, vice-president; and Dr. Henry L. Feffer, secretary-treasurer.

Hippocrates-Galen Society has elected Dr. George J. Stuart, president; Dr. George T. Sharp, Jr., vice-president; and Dr. John W. Latimer, Jr., secretary-treasurer.

Diabetic Association of the District of Columbia has elected Dr. Samuel Benjamin, president; Dr. Lawrence A. Rapee, first vice-president; Dr. Lawrence J. Thomas, second vice-president; and Dr. K. Hammond Mish, secretary.

The Rheumatism Society of the District of Columbia has elected Dr. Charles H. McEnerney, president; Dr. Charles P. Ryland, vice-president; and Dr. Milton C. Cobey, secretary-treasurer.

The first Oscar Benwood Hunter Award in Pathology, a check for $100.00, was presented to Allan Hugh Stewart, Mount Shasta City, California. This award is presented each year from the Oscar B. Hunter Memorial Fund, which was established by the George Washington University Medical Society to be presented to the senior student of the Washington University School of Medicine who shows outstanding ability in pathology.

Dr. James H. Scully, Washington, was presented the Frank E. Gibson Award certificate at the recent meeting of the Washington Medical and Surgical Society for having presented the outstanding scientific paper before the society this year, the subject being, "The Treatment of Metastatic Malignancy from Breast Cancer."

A Washington Chapter of the National Multiple Sclerosis Society has been formed with Dr. Walter Freeman, professor of neurology, George Washington University School of Medicine, as chairman of the Medical Advisory Board. The purpose of this chapter will be to raise funds for research, establish clinics for care of victims of this disease and to inform the public in the advancements in the fight against it.

Dr. G. Halsey Hunt, Washington, has been appointed assistant surgeon general of the Public Health Service.

Dr. Walter A. Bloedorn, dean of George Washington University School of Medicine, Washington, has been elected to membership on the National Board of Medical Examiners for a term of six years.

Dr. Thomas F. McDermott, assistant professor of anesthesiology, Columbia University College of Physicians and Surgeons, New York City, for the past year, has been appointed professor and director of the Department of Anesthesiology, Georgetown University Medical Center, Washington. He succeeds Dr. Theodore Guenther, who resigned to enter private practice in Cincinnati.

FLORIDA

Dr. Donald W. Smith, Miami, has been elected President, and Dr. John T. Stage, Jacksonville, Vice-President of the Florida Association of Blood Banks.

Dr. Samuel G. Hibbs, Tampa, was recently elected President of the Tampa Chapter, American Red Cross.

Dr. Albert L. Ward, Port St. Joe, has recently been appointed a member of the Florida State Board of Health, succeeding Dr. Mark F. Boyd, Tallahassee.

Dr. Robert B. McIver, Jacksonville, President, Florida Medical Association, announces the appointment of Dr. H. Phillip Hampton, Tampa, Chairman of the Committee on Legislature and Public Policy and Dr. James B. Friedman, Jacksonville, Chairman, Committee on Emergency Medical Service.

Dr. Leonard G. Rowntree, Miami Beach, has donated to the University of Miami's newly established medical school his personal medical library of more than six hundred volumes.

GEORGIA

Neurosurgical Society of America will hold its next meeting at Sea Island, The Cloister, September 18-20. Dr. C. D. Hawkes, Memphis, Tennessee, is secretary of the society.

Emory University School of Medicine, Atlanta, has added to its faculty: Dr. Eugene B. Ferris, Jr., Cincinnati, Ohio, as professor of medicine and chairman of the department of medicine; Dr. Bernard L. Hallman, Atlanta, instructor in medicine; Dr. Melvin Hess, University of Texas, instructor in anatomy; Dr. George Franklin Newman, Wayne University, instructor in anatomy; and Dr. Mary Elizabeth Walker, Pointe-a-la-Hache, Louisiana, instructor in pediatrics.

Dr. Horace B. Cupp, manager of the Veterans Administration Hospital, Chamblee, since March 1947, has been appointed manager of the 491-bed VA Hospital, Durham, North Carolina.

KENTUCKY

Kentucky Surgical Society at its recent annual meeting held in French Lick, Indiana, elected Dr. E. W. Jackson, Paducah, president; Dr. W. Vinson Pierce, Covington, vice-president; and reelected Dr. Francis M. Massie, Lexington, secretary-treasurer.

Continued on page 34

in hay fever

Pyribenzamine®

unsurpassed

as an antihistaminic agent

And the same is true in the many other allergic manifestations in which antihistamines are prescribed: *allergic rhinitis, serum sickness, angioneurotic edema, drug reactions, and itching skin conditions such as atopic and contact dermatitis and urticaria.* Recognized for its excellent therapeutic effectiveness and wide range of usefulness, Pyribenzamine is prescribed today as it was when it first became known *for maximum relief with minimal side effects.*

Ciba Pharmaceutical Products, Inc., Summit, N. J.

PYRIBENZAMINE (BRAND OF TRIPELENNAMINE)

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Continued from page 884

Dr. Everett Davis has completed a general practice residency at the General Hospital, Louisville, the first such residency ever offered by this hospital and the first in Kentucky.

The interns from Kentucky and hospitals of the state have completed their first year under the new Matching Plan for Internship Placement, a new effort sponsored by the National Inter-association Committee on Internships. The plan was developed in an effort to find a manner in which to distribute approximately 5,800 students among 10,500 internships.

Dr. Alice Newcome Pickett, former head of the department of obstetrics, University of Louisville School of Medicine, has been awarded the Algernon Sidney Sullivan Medallion, which is presented annually to the commonwealth's outstanding citizen of the year by the University of Louisville. The citation stated that Dr. Pickett had "established many prenatal clinics throughout the Commonwealth and many hundreds of specialists, trained by her, have gone out into cities and villages of Kentucky bringing her great skills and noble philosophy to mothers and infants."

LOUISIANA

Tulane University School of Medicine, New Orleans, has the following advancements in rank: to full professorships, Drs. John Adriani, surgery; Paul C. Beaver, parasitology; Frederick F. Boyce, clinical surgery; Manuel M. Garcia, clinical radiology; Chapman G. Johnson, clinical obstetrics and gynecology; Otto Schales, biochemistry; Walter S. Wilde, physiology; Willard R. Wirth, clinical medicine. New medical associate professorships were granted to Drs. Clarence T. Ray, medicine; Isidore L. Robbins, clinical medicine; John R. Snavely, medicine; and Alan G. C. White, biochemistry. Raised to rank of assistant professors: Drs. Elaine Louise Allen, clinical pediatrics; Jack R. Anderson, clinical otolaryngology; Roger B. Bost, clinical pediatrics; Louis S. Charbonnet, clinical surgery; John K. Hampton, Jr., physiology; Lee C. Schlesinger, clinical orthopedics; Walter G. Unglaub, medicine; Richard P. Vieth, clinical pediatrics; and Samuel Zurik, clinical otolaryngology. Dr. Clifford G. Grulee, Jr., associate professor of pediatrics, has been named director of the division of graduate medicine.

Dr. B. Bernard Weinstein, New Orleans, as president presided over the annual meeting of the International Fertility Association held in Chicago in June. Dr. Weinstein is associate professor of clinical gynecology, Tulane University School of Medicine.

Dr. Andrew Kerr, Jr., assistant professor of medicine, Louisiana University School of Medicine, New Orleans, recently received a grant from the Louisiana Heart Association for support of a project on experimental production of cardiac dilation and hypertrophy.

Dr. Myron Wegman has resigned as professor and head of the department of pediatrics, Louisiana University School of Medicine, New Orleans, to become Educational Director of the Pan-American Sanitary Bureau. He is succeeded by Dr. Nelson K. Ordway, associate professor of pediatrics.

Dr. Louise Lutz, New Orleans, has been appointed director of the Sara Mayo Hospital, succeeding Dr. Mayo L. Emory, who resigned to devote full time to his private practice.

MARYLAND

Dr. Edwin N. Broyles, Baltimore, was elected second vice-president of the American Laryngological Association at its annual meeting held recently in Toronto, Canada.

Dr. Edwards A. Park, Baltimore, received the John Howland Award for distinguished service to pediatrics at the annual meeting of the American Pediatric Society held recently at Old Comfort, Virginia.

Dr. Russell A. Nelson has been appointed director of the Johns Hopkins Hospital, Baltimore, succeeding Dr. Edwin L. Crosby. Dr. Crosby, for six years director of the hospital, has resigned to become executive head of the Joint Commission for the Accreditation of Hospitals.

The G. Canby Robinson Award (Lasker Foundation) for 1952 has been awarded to John Selley Derryberry, of Vanderbilt University Medical School, Nashville, Tennessee. This award, $250, is given to the third year medical student submitting the best clinical history in the fields of internal medicine or psychiatry.

Dr. Perry F. Prather, director of the Hagerstown and Washington County Department of Health, has been appointed deputy director of the Maryland State Department of Health with headquarters in Baltimore.

Continued on page 36

THE NEW YORK POLYCLINIC
MEDICAL SCHOOL AND HOSPITAL

(Organized 1881)

(The Pioneer Post-Graduate Medical Institution in America)

EYE, EAR, NOSE and THROAT

A combined full-time course covering an academic year (9 months). It consists of attendance at clinics, witnessing operations, lectures, demonstrations of cases and cadaver demonstrations; operative eye, ear, nose and throat on the cadaver; head and neck dissection (cadaver); clinical and cadaver demonstrations in bronchoscopy, laryngeal surgery and surgery for facial palsy; refraction; radiology; pathology; bacteriology; embryology; physiology, neuro-anatomy; anesthesia; physical medicine; allergy; examination of patients preoperatively and follow-up postoperatively in the wards and clinics. Also refresher courses (3 months).

PROCTOLOGY and GASTROENTEROLOGY

A combined course comprising attendance at clinics and lectures; instruction in examination, diagnosis and treatment; witnessing operations; ward rounds; demonstration of cases; pathology, radiology; anatomy; operative proctology on the cadaver; attendance at departmental and general conferences.

OBSTETRICS and GYNECOLOGY

A full-time course. In Obstetrics: lectures; prenatal clinics; witnessing normal and operative deliveries; operative obstetrics (manikin). In Gynecology: lectures; touch clinics; witnessing operations; examination of patients preoperatively; follow-up in wards postoperatively. Obstetrical and gynecological pathology. Anesthesia. Attendance at conferences in obstetrics and gynecology. Operative gynecology on the cadaver.

RADIOLOGY

A comprehensive review of the physics and higher mathematics involved, film interpretation, all standard general roentgen diagnostic procedures, methods of application and doses of radiation therapy, both x-ray and radium, standard and special fluoroscopic procedure. A review of dermatological lesions and tumors susceptible to roentgen therapy is given, together with methods and dosage calculation of treatments. Special attention is given to the newer diagnostic methods associated with the employment of contrast media such as bronchography with Lipiodol, uterosalpingography, visualization of cardiac chambers, perirenal insufflation and myelography. Discussions covering roentgen departmental management are also included; attendance at departmental and general conferences.

For Information about these and other courses Address

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not cholagogue
not choleretic
but hydrocholeretic

In nonobstructive biliary disease, stimulation of a large volume of bile with a high water content for copious flushing of the biliary tract is essential. To complement the hydrocholeresis, biliary duct and sphincter of Oddi relaxation is vital. Cholan-HMB contains dehydrocholic acid (250 mg. or 3¾ gr. per tablet)—the most potent, least toxic hydrocholeretic known. It also contains the safe, selective spasmolytic, homatropine methylbromide (2.5 mg. or 1/24 gr.)—with phenobarbital (8 mg. or 1/8 gr.).

MALTBIE . . . *first to develop American process for converting crude viscous ox-bile into chemically pure dehydrocholic acid.*

Chart shows increase in biliary secretion after injection of sodium dehydrocholate, as compared to various bile salts.

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Toxicity of Sedatives - The Clinical Factors

Rise in the use of sedatives can be traced directly to *living under tension* and the resultant increase in cases of *benign nervousness.*

The sedative employed to allay daytime nervousness and enable more restful sleep should:

1. effectively reduce tension
2. have low toxicity
3. be non-habit-forming
4. be non-soporific

} thus permitting the patient to carry out usual daytime activity.

It has been observed that the double salt calcium bromido-galactogluconate meets these criteria particularly well, since the bromine and calcium exert synergistic sedation, and at the same time, the calcium counter-acts bromine toxicity. (See table.)

Calcium bromido-galactogluconate is known as Calcibronat.

PROPERTIES OF SEDATIVES COMPARED

PROPERTY UNDER CONSIDERATION	BARBITURATES	ALKALINE BROMIDES (salts of Na, K & Ammonium)	CALCIBRONAT
Intensity of daytime sedation	Greater than necessary—results in drowsiness	Satisfactory—no drowsiness	Satisfactory—no drowsiness
Habit forming?	Yes	No	No
Cumulative toxicity	Relatively high	Tendency to bromism	Low
Palatability	Bitter, but can be given in tablet form.	Poor (disagreeable saltiness)	Good (no disagreeable taste)
Gastric toleration	Satisfactory	Poor (Alkalinity leads to gastric upset)	Good (no gastric irritation)

Calcibronat is a mild neuro-sedative, useful in treating cases of "nervousness." Its particular attributes are:

1. It does not cause sluggishness during waking hours.
2. It can be taken orally for prolonged use.
3. Because of its rapid onset of action, it can be used parenterally in unusually disturbed patients.
4. It is non-habit-forming and non-toxic.

Reference: ALPERT, B.: Year Book Of General Therapeutics, Chicago, Year Book Publishers, 1940, p. 371.

For further data on the use of this drug in the control of unpleasant symptoms, nervousness and pruritus associated with dermatologic conditions, write to:

Sandoz Pharmaceuticals

DIVISION OF SANDOZ CHEMICAL WORKS, INC.

Scientific Dept., 68 CHARLTON ST., NEW YORK, N.Y.

Continued from page 34

MISSISSIPPI

Dr. W. L. Little, Wesson, was recently honored by the Illinois Central Railroad System with a 14-karat gold plaque commemorating his fifty years of service as their local surgeon. In addition to the plaque Dr. Little and others who have served the Railroad fifty years or more were given a trip to Chicago in June and were the guests of the Railroad at a dinner and program at the Palmer House. Dr. Little is one of only three doctors of medicine who have served the Illinois Central Railroad for fifty years.

Dr. Eugene B. Ferris, Jr., a native of McNeill, has been appointed professor of medicine and chairman of the department of medicine, Emory University School of Medicine, Atlanta. Since 1940 Dr. Ferris has served as assistant director, department of internal medicine, Cincinnati General Hospital, Cincinnati, Ohio.

MISSOURI

Dr. Daniel L. Sexton, St. Louis, President, Mississippi Valley Medical Society, will preside at the seventeenth annual meeting of the Society to be held at St. Louis, October 1, 2 and 3.

Medical Alumni Association of Washington University in St. Louis has elected Dr. Wendell G. Scott, associate professor of clinical radiology at the university, president; Dr. James B. Costen, associate professor of otolaryngology, first vice-president; Dr. Walter M. Baumgarten, Jr., instructor in clinical medicine, second vice-president, and reelected Dr. Guy N. Magness, University City, secretary-treasurer.

John Everett Allison, Ph.D., a graduate of the University of Iowa, has joined the department of anatomy, St. Louis University School of Medicine, St. Louis, as an instructor.

Dr. Albert Kuntz, professor of anatomy and director of the department, St. Louis University School of Medicine, will deliver two papers before the Congress of Neurological Surgeons at the Chicago meeting, November 6-8. He will also address the Dental Study Section of the Division of Research Grants, National Institutes of Health in Washington, September 19-20.

NORTH CAROLINA

The 1952-1953 program of year-round postgraduate medical education at James Walker Memorial Hospital, Wilmington began July 1 with Dr. George T. Harrell, professor of internal medicine and director of the department, Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, as visiting chief. Other visiting chiefs participating in the program are Dr. Robert L. Sanders, Memphis, Tennessee, August 19-22; Dr. Robert B. Lawson, Winston-Salem, September 9-12; Dr. Richard W. TeLinde, Baltimore, Maryland, October 7-10; Dr. Charles C. Lund, Boston, November 4-7; and Dr. Bradley L. Coley, New York, December 2-5.

Dr. Thomas Craven, Huntersville, was recently named "Man of the Year" at a dinner of the Huntersville Lions Club and was presented a scroll by the president of the Mecklenburg County Medical Society, of which Dr. Craven has been a member for more than thirty years.

Dr. William Spencer Schwartz, Oteen, has been elected vice-president of the American Trudeau Society, the National Tuberculosis Association's medical division.

Dr. W. C. Davison, dean of Duke University School of Medicine, Durham, is one of five leading figures who have been appointed to a new Advisory Group of the Armed Forces Medical Library. The group of five civilians and four Armed Forces officers replaces the Association of Consultants to the Army Medical Library. Dr. Davison was president of that association and chairman of the executive committee.

Duke is one of some thirty Southern universities which will sponsor a new $100,000 research project in the Atomic Energy Commission's Oak Ridge Institute of Nuclear Studies to perfect a cheaper and safer method for cancer treatment. Dr. Paul M. Gross, vice-president of Duke University, is president of the Institute.

Duke investigators and their grants recently received under U. S. Public Health Service are: Drs. Frank L. Engel and Jack D. Myers, associate professors of medicine, $10,000 for support of studies on the effects of hormones and metabolic factors on certain liver functions; Dr. Grace P. Kerby, associate in medicine, $3,780 for research in pyrogen disappearance from the blood stream; Dr. Samuel P. Martin, assistant professor of medicine, $7,479 for study of the effect of bacterial products on human leukocytes; and Dr. William W. Shingleton, associate in surgery, $3,240 for studies in the modification of resistance in the sphincter of Oddi.

Duke Hospital has opened a new speech service for hairlip and cleft palate children of North Carolina, according to an announcement by Dr. Murray M. Halfond, medical speech pathologist.

Continued on page 44

antidote for spasm

Tension of body and mind whether of central or autonomic origin finds a safe, pleasant antidote in Barbidonna. This logical combination of the natural belladonna alkaloids and phenobarbital affords the smooth spasmolysis . . . the balanced sedation . . . so essential for rapid control of smooth muscle spasm in the gastro-intestinal, cardiovascular, respiratory or urogenital tracts and psycho-tension of the central nervous system. Write today for further information and a professional sample.

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Phenobarbital . . . . . 16.0 mg. (¼ gr.)
Belladonna Alkaloids . . . . . 0.134 mg.
(approximately equivalent to ½ gr. belladonna leaves or 7 min. Tr. belladonna)
Tablets: in bottles of 100, 500 and 1000
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Pantothenic Acid	3.4 mg.
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Inositol	113.4 mg.
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Biotin	30 mcg.
Para-Amino-Benzoic Acid	280 mcg.

Plus independent vitamin B growth, lactation, pellagra-preventive, and other vitamin B factors natural to genuine Brewers' Yeast.

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Wherever reliable, gentle sedation is required, the synergistic formula of Phenobromidine (Tilden) is a sedative of choice. Rapidly and effectively, this convenient, easy-to-take liquid quiets your excitable, tense, nervous patients without the usual fluctuation associated with the barbiturates administered alone.

	per fluid ounce	per 100 cc.
Phenobarbital	2 gr.	0.44 Gm.
Potassium Bromide	30 gr.	6.50 Gm.
Sodium Bromide	30 gr.	6.50 Gm.
F. E. Passion Flower	16 min.	3.30 cc.

Average Dose: one teaspoonful as needed. Supplied in pints and gallon bottles.

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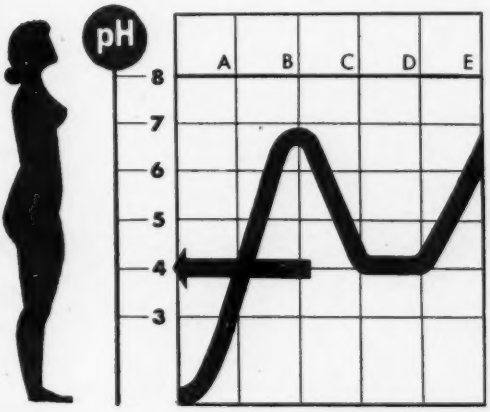
In Trichomonas infection..

treatment "must not only include a trichomonacide, but it must furnish sugars to be stored as glycogen in the vaginal epithelium and provide a favorable medium for regeneration of the Döderlein's bacilli...".*



The normal adult vaginal mucosa is relatively thick, rich in glycogen and its secretions have an acidity within the range of pH 3.8 to 4.4. Glycogen is metabolized to lactic acid by the Döderlein bacilli, thus maintaining the normal acid state.

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Searle RESEARCH IN THE SERVICE OF MEDICINE

*Boehme, E. J.: Trichomonas Vaginalis Vaginitis; Diagnosis, Treatment, Causes of Failure in Treatment, S. Clin. North America 25:545 (June) 1945.

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friendly in taste – tastes like chocolate pudding – readily taken by children . . . or adults.
friendly to normal aciduric flora – the type essential to normal peristalsis. Suppresses putrefactive bacteria to obviate distressing flatulence.
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Iron	15 mg.	100%
Calcium	1500 mg.	100%
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Pyridoxine	1.5 mg.	**
Vitamin B_{12}	3 mcg.	**
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Cobalt	0.3 mg.	.....
Copper	3 mg.	.....
Iodine	0.45 mg.	.....
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Manganese	3 mg.	.....
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*RDA in pregnancy 1500 mg., in lactation 2000 mg.
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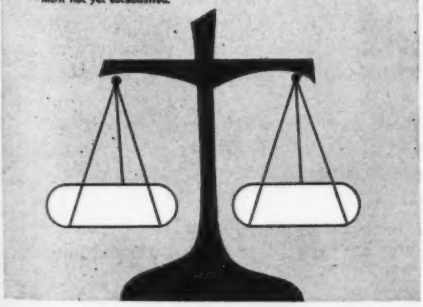

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Miami Beach, Florida **November 3-8, 1952**

The faculty will consist of 20 clinicians and investigators eminently qualified in the fields of endocrinology and metabolism.

The program will consist of lectures, clinics, laboratory demonstrations and scientific exhibits.

The 64 lectures to be presented will cover all phases of endocrinology and metabolic disorders. Ample time will be given for discussions and answers at the end of each session and registrants are encouraged to contact members of the faculty for individual discussions. The entire program has been designed to interest not only the specialist but those in general practice and has been approved by the American Academy of General Practice for postgraduate credit.

A simultaneous translation of all lectures into Spanish will be provided through earphones.

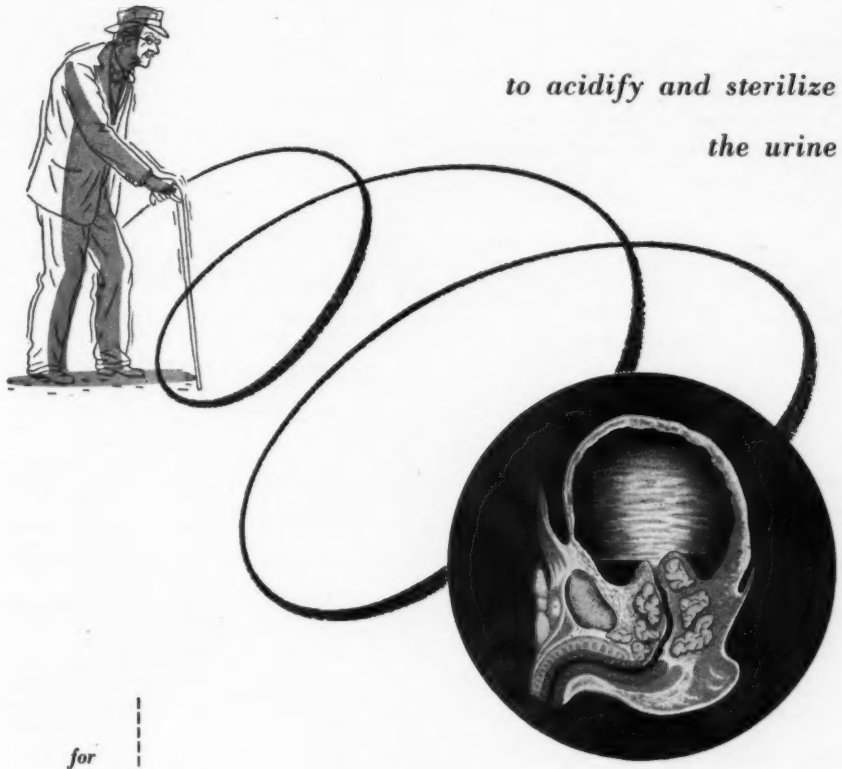
Copies of the proceedings of the Assembly will be available to all registrants.

The Roney Plaza with its tropical gardens, outdoor swimming pool, putting greens, private beach and Cabana Club, has long been recognized as one of Florida's great beach hotels and offers special convention rates to members of this Assembly. The Surf Room, in which the sessions will be held, is delightfully air conditioned and has subdued lighting which permits taking of notes and viewing lantern slides with comfort.

A fee of $75 will be charged for the entire course and the attendance will be limited to 200. REGISTRATION WILL BE IN THE ORDER OF CHECKS RECEIVED AND WILL CLOSE ON OCTOBER 3, 1952. Should there be an insufficient number of applicants to fill the course, the registration fee will be refunded immediately in its full amount.

Please forward application on your letterhead, together with check payable to The Endocrine Society, to Henry H. Turner, M.D., Secretary-Treasurer, 1200 North Walker Street, Oklahoma City 3, Oklahoma, before October 3, 1952. Further information and program will be furnished upon request.

Hotel reservations should be made directly with the Roney Plaza Hotel, Miami Beach, Florida, and the hotel advised that you are attending this Postgraduate Assembly.



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Continued from page 36

OKLAHOMA

Oklahoma City Clinical Society Conference will be held in Oklahoma City, October 27-30.

The new Memorial Hospital, Woodward, was opened recently with Dr. Joe L. Duer as chief of staff. The hospital is a memorial to casualties of World Wars I and II and to victims of the tornado of April 9, 1947. Mayor Brandon Frost presented the building to the Memorial Hospital Foundation.

Dr. William T. Hawn, Binger, was recently honored by the people of Binger and surrounding areas at an "appreciation day" occasion. Dr. Hawn has served as mayor and has been awarded a life membership in the Oklahoma State Medical Association.

SOUTH CAROLINA

Dr. Thomas A. Pitts, Columbia, has been awarded the medal of the American Cancer Society for exceptional service in the 1951 cancer program.

Dr. D. J. Greiner, a graduate of the University of Pittsburg, has been appointed Director of the department of pathology, McLeod Infirmary, Florence.

Dr. W. McNeill Carpenter has reopened his office in Greenville, practice limited to eye, ear, nose and throat specialty.

Dr. B. J. Workman, Woodruff, has been appointed to the State Advisory Hospital Council for a four-year term, replacing Dr. M. R. Mobley, Florence.

Dr. O. A. Alexander, Darlington, who became County Health Officer of Darlington County in 1950, has returned to private practice and is associated with Dr. A. P. Rosenfeld.

Dr. William P. Turner, Greenwood, replaces Dr. C. H. Blake, Greenwood, on the State Board of Medical Examiners, and Dr. Wyman King, Batesburg, replaces Dr. J. D. Parker, Greenville, on the State Board of Examination and Registration of Nurses.

Dr. Walter R. Mead, Florence, is the recipient of the "Man of the Year" civic service award, sponsored annually by the local Rotary, Kiwanis, Optimist, Lions and Exchange Clubs.

Dr. J. Earle Furman has opened an office in the Jervey Building, Greenville, for the practice of pediatrics.

Dr. Charles Geilfuss has entered general practice in Charleston and is associated with Dr. A. E. Rawl.

Dr. Robert Leonard, Greenville, has moved to Charlotte, North Carolina, to be resident in surgery at the Charlotte Memorial Hospital.

Dr. Henry Heins has opened an office in Charleston for the practice of obstetrics and gynecology.

Dr. James Simpson has opened an office in Charleston for the practice of obstetrics and gynecology.

Dr. Guy Castles has opened an office in Columbia for the practice of pediatrics.

TENNESSEE

University of Tennessee Medical Units, Division of Physiology, Memphis, has been awarded two research grants by the American Heart Association: $5,250 for the study of hypertension and kidney disease by Dr. C. Riley Houck; and $5,050 for a study of the factors which produce the heart sounds by Dr. R. L. Little.

Tennessee Radiological Society has elected Dr. J. E. Whiteleather, Memphis, president; Dr. Joseph McKinney Ivie, Nashville, vice-president; and Dr. J. Marsh Frere, Chattanooga, secretary-treasurer.

Dr. Charles R. Park, formerly of Washington University School of Medicine, St. Louis, Missouri, has been appointed professor of physiology and head of the department, Vanderbilt University School of Medicine, Nashville.

Dr. Wesley A. Barton, who has practiced in Chattanooga since 1942, has opened an office in Cleveland.

Dr. Parker D. Elrod has joined Dr. Ogle Jones in the practice of medicine at Centerville.

Dr. Lester F. Littell has opened a clinic in the Cumberland Heights Community, and is Grundy County's only doctor. The county has been without a physician nearly three years.

Dr. Ira F. Porter, Greenfield, was recently cited by a local newspaper as the "Citizen of the Week," the citation listing his many professional and civic interests along with his hobbies.

Dr. Hal Henard, Greeneville, succeeds Col. E. W. Palmer, Kingsport, as chairman of the Board of Trustees of Tusculum College. Dr. Henard recently had conferred upon him by

Continued on page 46

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Dilaudid* **sulfate**

10 cc. Multiple Dose Vial

Each cc. contains 2 mg. (1/32 gr.) dihydromorphinone (Dilaudid) sulfate in sterile solution—convenient and ready for instant use.

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an opiate, may be habit forming.

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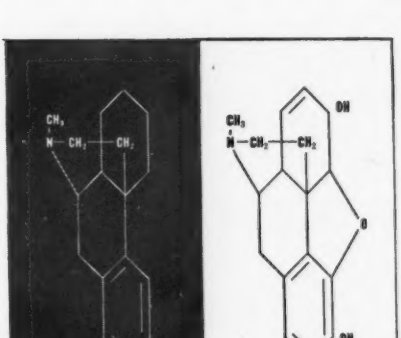

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diminished urine	rare	frequent
constipation	rare	frequent
disorientation	rare	frequent
depressed appetite	rare	frequent
nausea	less	occasional
vomiting	less	occasional

Caution: Dromoran is a narcotic analgesic. It has addiction liability equal to morphine and for this reason the same precautions should be taken in administering the drug as with morphine.

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*Average dose

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Continued from page 44

the college an honorary Doctor of Science degree in recognition of his community and military service record.

Dr. Robert I. Carlson has been appointed as chief of the surgical service, Thayer Veterans Administration Hospital, and will also hold an appointment as associate professor of surgery at Vanderbilt University School of Medicine, Nashville.

Dr. Gene Thomas Qualls, who received his M.D. degree in June, began an internship in pediatrics at Vanderbilt Hospital, Nashville, July 1. Dr. Qualls was awarded the Borden Undergraduate Research Award in Medicine for the year 1952, which award consists of $500 and is given to the student in the graduation class who, during any year while enrolled in the school, has carried out the most meritorious research in the medical field.

University of Tennessee, Memphis, has received a $9,720 grant to be used to establish a tumor registry and a library of tumor slides under the supervision of Dr. Cyrus C. Erickson, according to announcement by the Public Health Service of the Federal Security Agency.

Dr. Jesse D. Perkinson, Jr., senior scientist in the Medical Division of the Oak Ridge Institute of Nuclear Studies, Oak Ridge, has joined the staff of the University of Tennessee Medical Units, Memphis, as associate professor in the department of biochemistry.

Dr. Granvil C. Kyker, formerly professor and head of the department of biochemistry and nutrition, University of Puerto Rico School of Medicine, succeeds Dr. H. D. Bruner as principal scientist of the medical division of Oak Ridge Institute of Nuclear Studies, Oak Ridge. Dr. Bruner on July 1 became professor and chairman of the department of physiology at Emory University School of Medicine, Atlanta, Georgia.

Dr. Samuel Colville Lind of the Carbide and Carbon Chemicals Company staff at the Oak Ridge National Laboratory, will have the highest honor in American chemistry bestowed upon him September 15 when he will be presented by the American Chemical Society the Society's Priestley Medal at its 122nd national meeting to be held in Atlantic City. Dr. Lind is internationally known for his research on radium and radioactivity. He is a past president of the society and dean emeritus of the University of Minnesota Institute of Technology.

Dr. Charles Summers Robinson, professor of biochemistry at Vanderbilt University School of Medicine, Nashville, since 1931, retired from active duties in July and became emeritus professor of biochemistry.

TEXAS

North Texas-Southern Oklahoma Fall Clinical Conference will be held at Wichita Falls, September 17. Dr. E. Aubrey Cox, Wichita Falls, is chairman.

Dr. George V. Brindley, past-president of the Southern Surgical Association and staff member of Scott-White Clinic, Temple, was principal speaker at a banquet given by Baptist Memorial Hospital, Memphis, Tennessee, attended by several hundred doctors throughout the mid-south area. The banquet was in celebration of the hospital's 40th anniversary, July 13-20.

University of Texas, Department of Medicine, Galveston, has received a renewal of a $5,000 research grant which was first issued last year, as announced by Dr. William P. Boger, medical director of Sharp & Dohme, Inc., Philadelphia. The grant is to be used for clinical and laboratory evaluation of soluble pertussis vaccine by Dr. Harriet Felton and research studies will be directed by Dr. Arild E. Hansen, chairman of the Department of Pediatrics.

The University of Texas M. D. Anderson Hospital for Cancer Research has received a grant of $18,200 to establish a tumor registry and a library of tumor slides for cancer pathology educational use, under the direction of Dr. William O. Russell.

Texas Hospital Association at its recent meeting installed Dr. Carroll H. McCrary, Tyler, president; and elected Dr. W. U. Paul, El Paso, president-elect; Dr. John Dudley Houston, vice-president; Dr. Boone Powell, Dallas, treasurer; and Drs. Horace M. Cardwell, Lufkin, D. S. Riley, Big Spring, and H. R. Dickey, Corpus Christi, trustees.

Katy Medical Association held its first annual meeting in Galveston recently with an attendance of about sixty doctors. The organization is composed of members of the medical staff of the Missouri-Kansas-Texas Railroad Employees' Hospital Association and of the Missouri-Kansas-Texas Lines.

The Galveston County Memorial Hospital, Lamarque, was recently dedicated.

Dr. Charles S. Amidon, Harlingen, who has completed fifty years of medical practice, was recently given a dinner and presented a plaque by the Valley Baptist Hospital staff members.

Dr. Wallace Wilkinson, Dallas, was recently honored for his twenty years' work at the Oak Cliff Lions Club eye, ear, nose and throat clinic, Methodist Hospital, when "Dr. Wallace Wilkinson Day" was observed.

Continued on page 52

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(1) Hanson, I. R. and Hingson, R. A., *Current Researches in Anesthesia and Analgesia*, 29:136 (May-June) 1950

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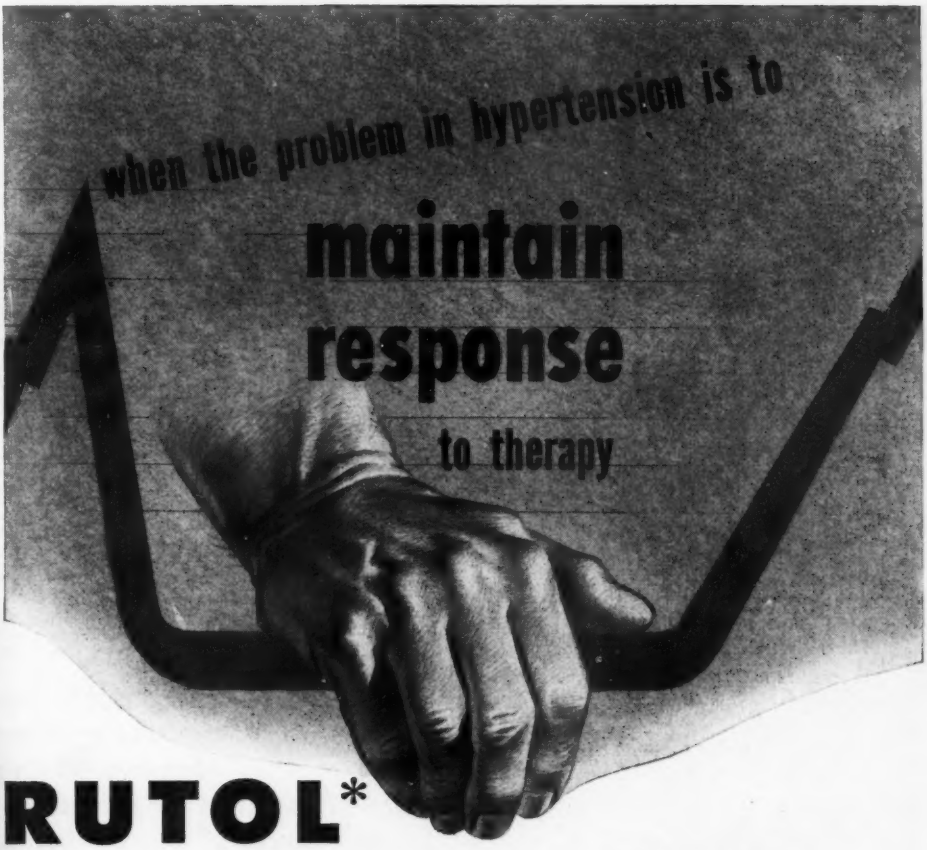

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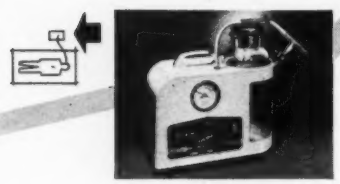

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VERUTAL
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EFFECTIVE
NON-TOXIC
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which combines

VERATRUM VIRIDE with other therapeutically effective ingredients essential for the correct management of hypertension.

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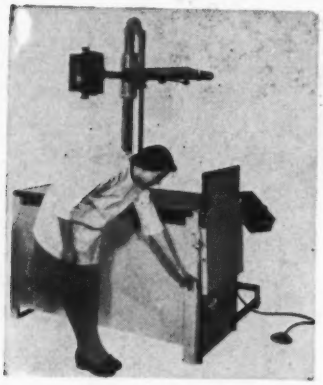

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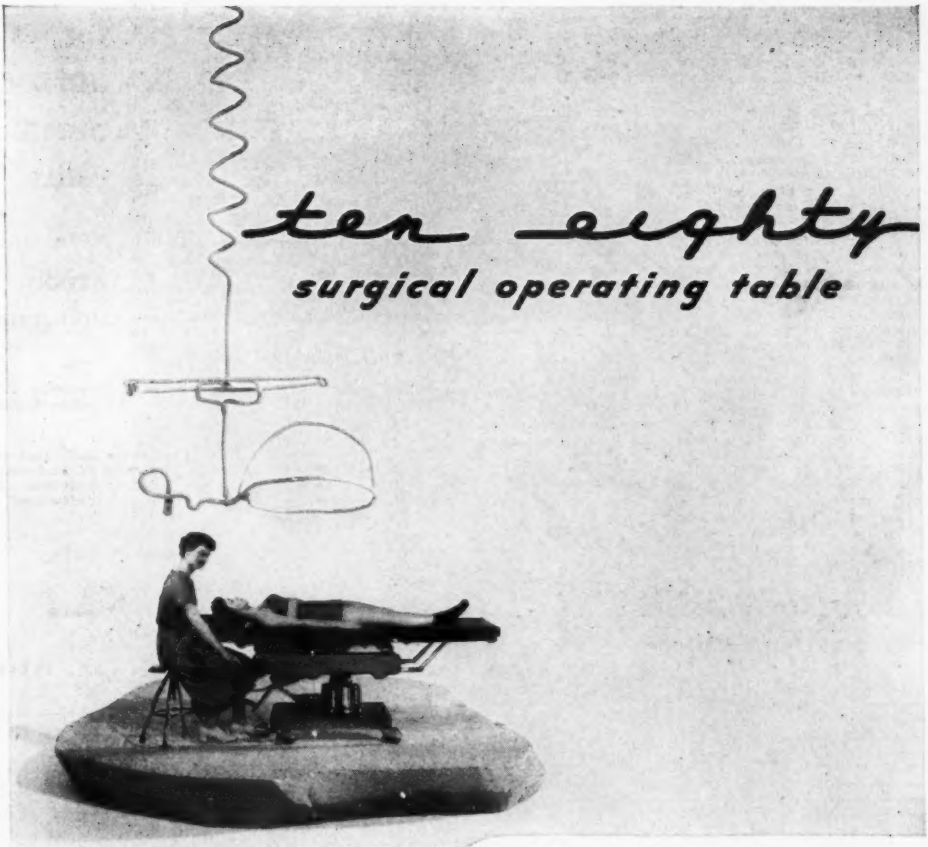

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Continued from page 46

VIRGINIA

Virginia Society of Ophthalmology and Otolaryngology at its recent annual meeting installed Dr. A. D. Morgan, Norfolk, president; and elected Dr. Peter N. Pastore, Richmond, president-elect; Dr. M. K. Humphries, Jr., Charlottesville, vice-president; and Dr. G. S. Fitz-Hugh, Charlottesville, reelected secretary-treasurer.

Dr. Ben Storer has been appointed health officer of the Smyth-Washington-Bristol Health District.

Dr. Charles M. Wylie has begun his duties as health officer of Buena Vista-Lexington-Rockbridge Health District after being on educational leave.

Dr. Oliver B. Bobbitt has been appointed director of the Clinical Laboratories, University of Virginia Department of Medicine, Charlottesville, and chairman of clinical pathology.

Dr. Arthur Ebbert, Jr., has been appointed assistant to the dean of the University of Virginia Department of Medicine, Charlottesville, and instructor in internal medicine.

Dr. Charles A. Finnigan has been appointed assistant professor in charge of the new psychiatric out-patient clinic, University of Virginia Department of Medicine, Charlottesville; and Drs. William D. Buxton and Dr. Cary Suter as instructors. The clinic was opened July 1.

Dr. Montie L. Binder, Newport News, has been named city and jail physician of that city, succeeding Dr. Thomas D. Morewitz, resigned.

Dr. M. R. Emlaw has resigned as part-time physician at City Home, Richmond, and is succeeded by Dr. George Benjamin Carter. Dr. Leonard D. Polikoff has resigned as medical examiner in charge of medical service for city employees and is succeeded by his assistant, Dr. Robert Miskimon. Dr. Richard Norton Baylor has been appointed assistant.

Dr. Walter P. Martin, Norfolk, was elected vice-president of the American College of Physicians at its last annual meeting.

The Alumni Association of the Medical College of Virginia has installed Dr. H. Hudnall Ware, Richmond, president; and elected Dr. J. Asa Shield, Richmond, president-elect. Mr. J. Curtiss Nottingham and Dr. Harvey B. Haig, both of Richmond, were reelected secretary and treasurer, respectively.

Medical College of Virginia, Richmond, has announced that gifts and grants for the fiscal year 1951-52 totals $2,843,597.42. Randolph-Minor Hall, teaching unit and dormitory for nurses has just been completed at a cost of $687,000 equipped; and the college now has under construction the Wood Memorial Dental School Building to be completed in 1953 at an approximate cost of $1,847,000 equipped. Funds are available for a $250,000 addition to McGuire Hall and $1,875,000 for a hospital for the surgical treatment of Negro tuberculosis patients jointly with the State Board of Health.

The new medical center at Louisa, a combination health and medical center, was dedicated recently. The staff is composed of Drs. H. W. Judd, E. B. Pendleton, H. S. Daniel, John W. Barnard, T. E. Stanley, Griffith B. Daniel, Evelyn P. Daniel, M. T. Lowry, Stuart W. Selden, and Charles K. Perkins, dentist.

WEST VIRGINIA

Dr. Cecil O. Post, Clarksburg, has been appointed a member of the Council of the Southern Medical Association from West Virginia for a regular Council term of five years, beginning at the close of the annual meeting in Miami, Florida, in November, the appointment having been announced recently by the President-Elect, Dr. Walter C. Jones, Miami, Florida. Dr. Post succeeds Dr. Andrew E. Amick, Lewisburg, whose term will expire with the close of the Miami meeting in November, and who having served the constitutional limit is not eligible for reappointment.

Dr. Americus Judson Kemper, Clarksburg, after twenty-one years of service, has retired as health officer of Harrison County.

Dr. David C. Prickett, Weston, has been appointed director of Marion county health department to succeed Dr. A. Glenn Evans who resigned. Dr. Prickett was former health officer of district No. 4.

Dr. Frank J. Holroyd, Princeton, has been appointed a member of the Medical Licensing Board for a term ending June 30, 1957. Dr. Holroyd is a past president of the West Virginia State Medical Association.

Dr. Hu C. Myers, Philippi, has been appointed a member of the advisory board to the hospital licensing program of the state department of health. His term expires June 30, 1959.

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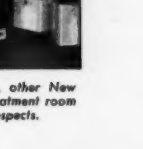

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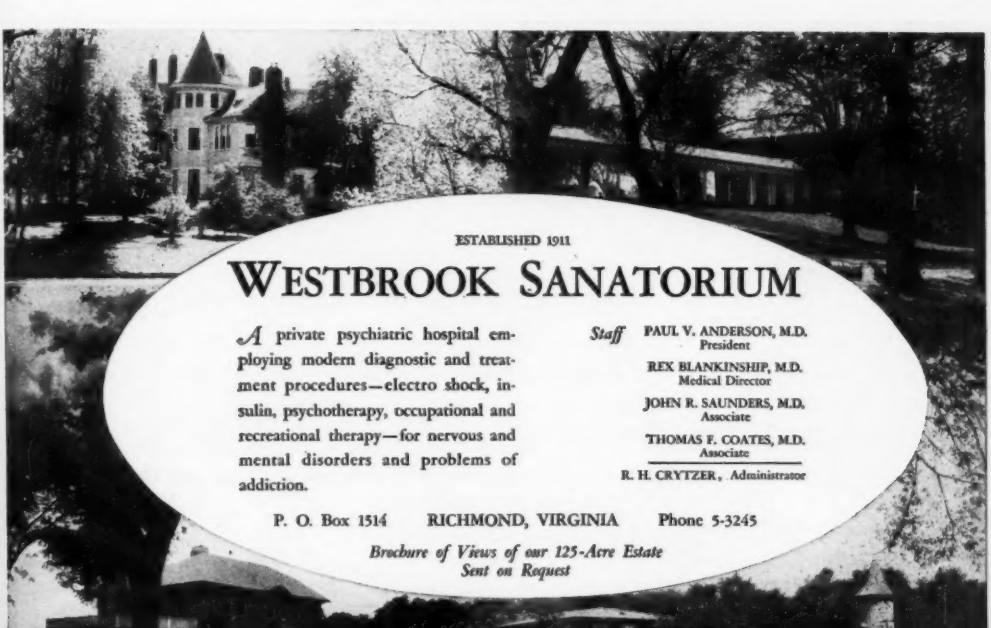
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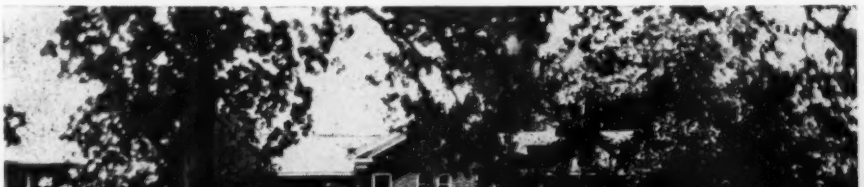

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For the Diagnosis and Treatment of Nervous and Mental Diseases, Drug Addiction and Alcoholism.

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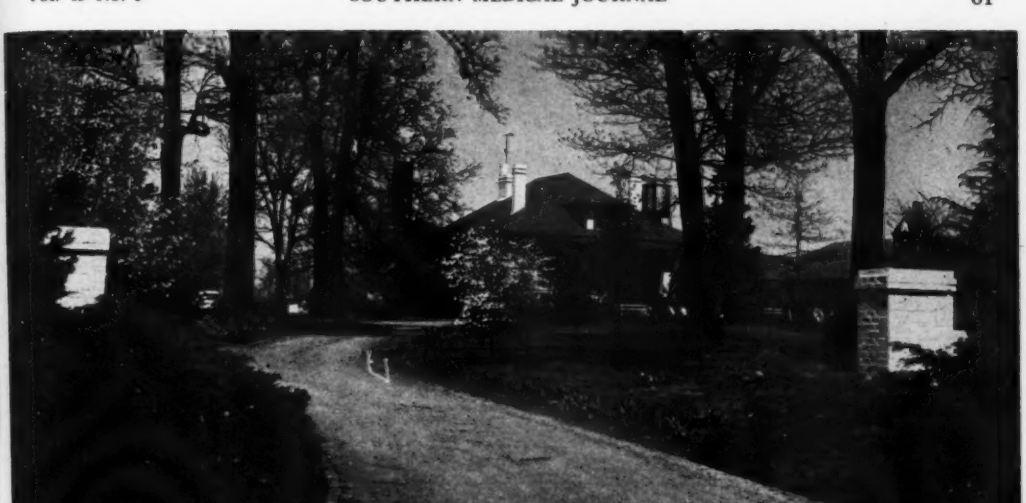

CARROL TURNER SANATORIUM

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For the Diagnosis and Treatment of Mental and Nervous Diseases

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Modernly equipped with adequate facilities for physical and hydrotherapy, electroshock, and insulin theapy

Special emphasis is laid on recreational and occupational therapy

Adequate nursing personnel assures individual attention to each patient

The main building and hospital department of the Sanatorium is shown above

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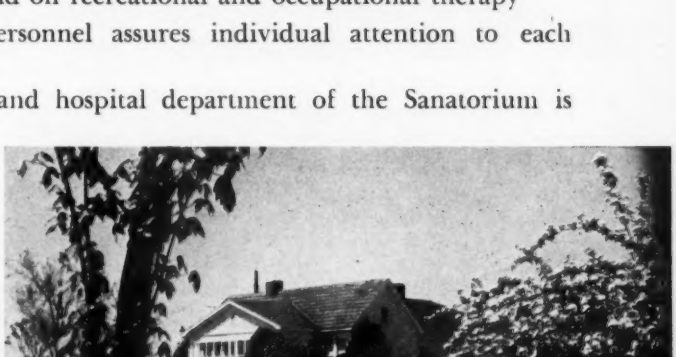
Our convalescent home is located on the Sanatorium Grounds

The home is especially designed and fitted for the care of elderly people.



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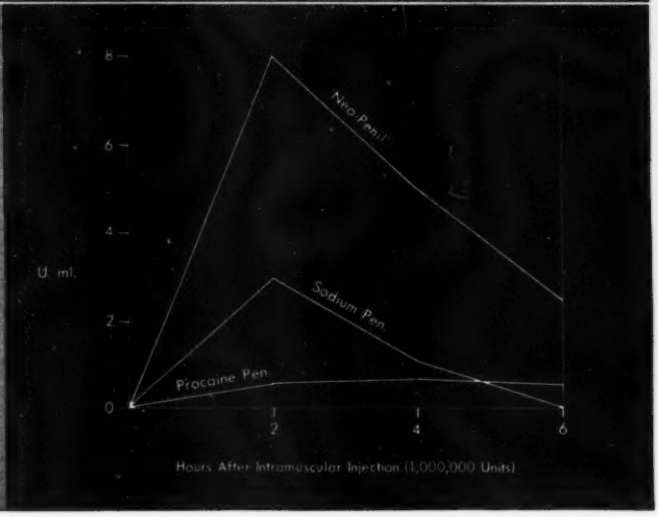
a chemical derivative of penicillin

which concentrates in the lung and sputum

NEO-PENIL*

for aqueous injection

Comparison of average sputum levels in humans, from Heathcote.[1]



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Patent Applied For

1. Lancet *1*:1255 (June 9) 1951.

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